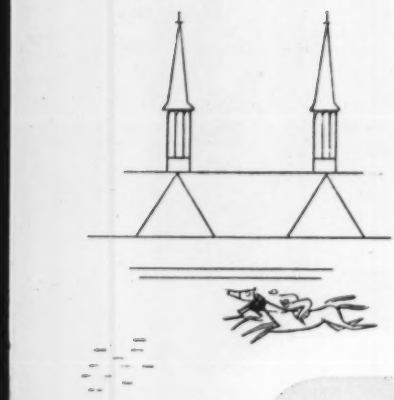
AUGUST 9, 1954

STEEL
THE WEEKLY MAGAZINE OF METALWORKING



Louisville

INDUSTRY WIDENS THE GATEWAY

—page 63

✔ **NEW SPECS FOR ALUMINUM**
Common Denominator—Boon to Buyer, p. 94

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When Buying Electric Cranes

BRAKES · DISCONNECT SWITCHES
CONTROLLERS · LIMIT STOPS

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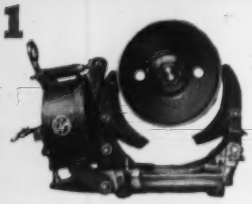
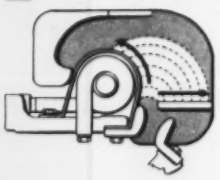


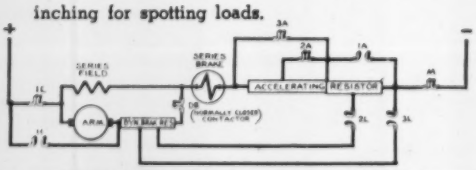
LONG-LIFE brakes for cranes operated by a-c or d-c power. . . Give high speed performance—with low upkeep.

2



Contactors operate on the LINE-ARC principle — no destructive burning of arc shields—cool contacts . . . reduced maintenance.

3 Simplified, Safe Dynamic Lowering Circuits for hoist motions respond quickly and permit accurate inching for spotting loads.



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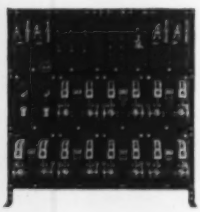


Reversing-plugging Control for bridge and trolley motions — automatically-controlled acceleration and only one adjustable relay for plugging.

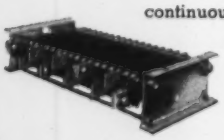
5

Youngstown Safety Limit Stops protect against overhoisting accidents—a positive check against human errors.

6

Cam-type Master Switches have narrow width and short throw—less fatiguing on the operator.

7 Tab-Weld Plate Resistors—spot-welding provides a continuous path, and keeps resistance value constant.



8

Manual-magnetic Disconnect Switches operate with ease—are arranged to control crane lights, too.

Put your crane control problems up to EC&M. Each job is accurately engineered to give fine performance. When buying cranes, specify EC&M for complete crane control.

THE ELECTRIC CONTROLLER & MANUFACTURING CO.

The Finicky Fellow in the Scrapyard

There's an old saying here at Bethlehem that *good bars start with good scrap.* That's why we make sure that the scrap we use to make carbon bar steel is mighty good material.

And that's where this hard-to-please fellow comes in. He's a Bethlehem scrap inspector—one of the men who gives every incoming carload a thorough going-over; checking it against the shipping bill; ferreting out off-grade material.

Like most of our scrap inspectors, he's been with Bethlehem for a good many years. Knows his job inside out. His practiced eye can classify an entire carload, perhaps in less time than it takes us to tell you about it. And at the same time, he's on the look-out for evidence of non-ferrous materials that can "poison" a heat of steel, and may seriously impair the quality of the finished bars. The inspector has authority to sidetrack any car for more detailed testing and elimination of contaminated material.

Seems like a lot of fuss over a thing as simple-sounding as scrap, doesn't it? Well, when it comes to producing hot-rolled carbon bars we make a point of being finicky—in the scrapyards, around the open hearths, in the rolling mills. The result is, we think you'll agree that it's tough to beat Bethlehem Hot-Rolled Carbon Steel Bars for quality. Why not try some? Call any Bethlehem sales office, and tell us your requirements.

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On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

A discussion of some important decisions which the user must make in selecting the right grade and type to fit his needs. Includes 6 pages of highly useful engineering data sheets.

WRITE:
Publications Dept., Div. S
Bethlehem Steel Company
Bethlehem, Pa.

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STANDARD SECTIONS • SPECIAL SECTIONS • BAR SIZE SHAPES

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7550

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BALL AND ROLLER BEARINGS

From the men who design... to the men who use...

The handling ease of an ATLAS Sling means safe, fast, LOW-COST HANDLING

30,000-lb. propeller being handled with one 8-part ATLAS Braided Sling in figure 8 Choker-Hitch. Notice how the braided body hugs the contour of the load.

A sling designed to handle easily will handle loads faster. That's the reason why flexibility, lightness, and handling ease are part of the basic design of Macwhyte ATLAS Round-Braided Slings.

Here's how handling ease is built into the finished ATLAS Sling: all ropes in ATLAS Slings are braided in a continuous, spiral path. Ropes are endless—all ropes in the body are the same length and carry an equal share of the load. There are two pairs of Left Lay, and two pairs of Right Lay ropes—making a total of eight ropes in the equally balanced-braided body of the Sling.

Users can attach ATLAS Slings faster because of their "built-in" handling ease. And these Slings last longer because they do not snarl, kink, or curl up as easily as ordinary slings.

Many Macwhyte Slings of standard design in Round-Braided, Flat-Braided, Single-Part, and Grommet Slings are illustrated in the Macwhyte Sling Catalog. Special slings can be designed to meet individual requirements.

Macwhyte engineers will gladly recommend the proper sling for your material handling needs. Their recommendations can save you time, money, and labor.

Ask any Macwhyte distributor, or write direct to:

MACWHYTE COMPANY
2912 Fourteenth Ave., Kenosha, Wis.

Send for Bulletin 5308 containing load rating tables, illustrations, and general information on slings.

MACWHYTE

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1064-B

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LATEST move in the transportation of liquid chemicals is the recent launching of the S.S. Marine Dow-Chem. This is the first large-capacity, seagoing chemical tanker to be built in the United States. And the G.T.M. – Goodyear Technical Man—played an important part in its design and construction.

Nestled in the ship's forward hold are six huge, bottle-shaped tanks specifically built for the interchangeable transport of hydrochloric acid and concentrated caustic solution. To handle such corrosive chemicals on an alternating basis, these 40,000-gallon tanks are lined with a custom-made PLIOWELD compound, specified by the G.T.M., but only after six years of laboratory and field tests.

PLIOWELD is a dense, resilient rubber sheet. It can and does resist a wide range of acids, alkalies, salts, alcohols, fumes, gases and water. It also resists abrasion. It always is compounded to withstand the particular corrosives or abrasives to be handled. And it always is permanently bonded to the metal by an exclusive Goodyear process.

If your equipment is threatened by corrosion or abrasion, call on the G.T.M. for protection with PLIOWELD. You can contact him by writing Goodyear, Industrial Products Division, Akron 16, Ohio.

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Plioweld—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

This Week in Metalworking

STEEL

Vol. 135 No. 6 August 9, 1954

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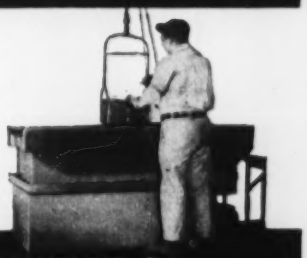
cut cleaning costs RIGHT DOWN THE LINE!



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UNOBSTRUCTED TANK WALLS. The condensing coil and trough are recessed into a back compartment providing *superior vapor control, more efficient solvent reclamation,* and an *unobstructed working area.*

WATER SEPARATOR and PUMP CHAMBER, fabricated of stainless steel, are *unitized* for easy removal in minutes.

SIMPLIFIED MAINTENANCE. Service connections, clean-out openings, and controls are located at one end of machine.

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All types of vapor degreasers, automatic or hand operated, are available in standard and special sizes.

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METALWASH has prepared an authoritative, illustrated booklet containing a description of the theory and operation of vapor degreasers plus diagrams and cutaway photographs of the three basic types of degreasers. **Write today for your Free copy.**

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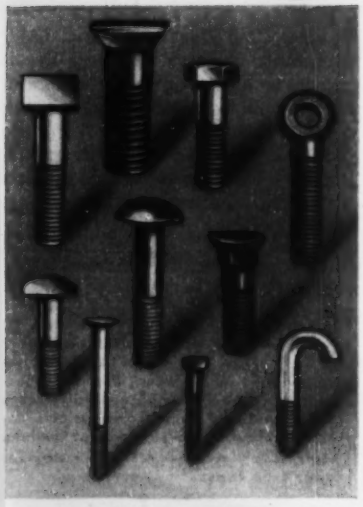

BETTER BOLTS SINCE 1882

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MANUFACTURING COMPANY
327 Pine St. • Pawtucket, R. I.
THE PLACE TO SOLVE YOUR BOLT PROBLEMS
T.M. REG.
"The Bolt Man"

behind the scenes

Merriment in Merry England

Along about 4:30 P.M. on a fine spring day in 977 B.C., the gloomy Preacher in Ecclesiastes tugged reflectively at a handful of whiskers and remarked with a sigh that there was nothing new under the sun. In all the ensuing history of mankind, no other expression has taken more of a beating, because when you want to suggest that something or other hath been done before and ith now old hat, what do you say? You make like a philosopher, and utter that tired old crack concerning the dearth of novelty under the star of noon.

Still, when you come across a 1355 A.D. version of pie in the sky, what else can you say? "Is there anything," groaned the Preacher, "whereof it may be said: See, this is new?" The answer, Doc, is no.

The current debate over and examination of questions concerning a guaranteed annual wage, extended paid vacations, employment security and other items of major importance in the field of industrial relations lead us to examine some of the working conditions that obtained in England in the year 1355. In those distant and happily vanished days workmen made iron in crude blast furnaces. The imperfectly molten iron was later hammered into a shapeless blob or bloom, weighing about 200 lbs. For working up the bloom at the forge, the smith received sixpence.

Sometimes, by extending his labor and risking a hernia, he could produce a bloom in one day. Thereafter, by cutting the bloom into bars, the wily smith could wring another penny from his employer.

Such additional labor as was required was supplied by the wives of the smith, foreman and blowers. These thoughtful and considerate ladies broke up the ore, attended the bellows, swabbed sweat from their mates and stabbed management to the extent of one half penny per bloom. Ah, what happy times! The whole cheery crew, joyfully hauling in pennies by the handful, secure in their employment and rejoicing in their labor, must have been agreeable and contented. But soft! Hath not somebody goofed?

Indeed, somebody hath, and an organizer appeared. Immediately thereafter dissension and gloom spread among the iron workers: they moped, and became unhappy with their lot until their demands were granted. Management, brought to its knees, finally surrendered and granted an allowance of one penny a week for ale for the workmen.

Boy, page an organizer!

Possibilities Unlimited

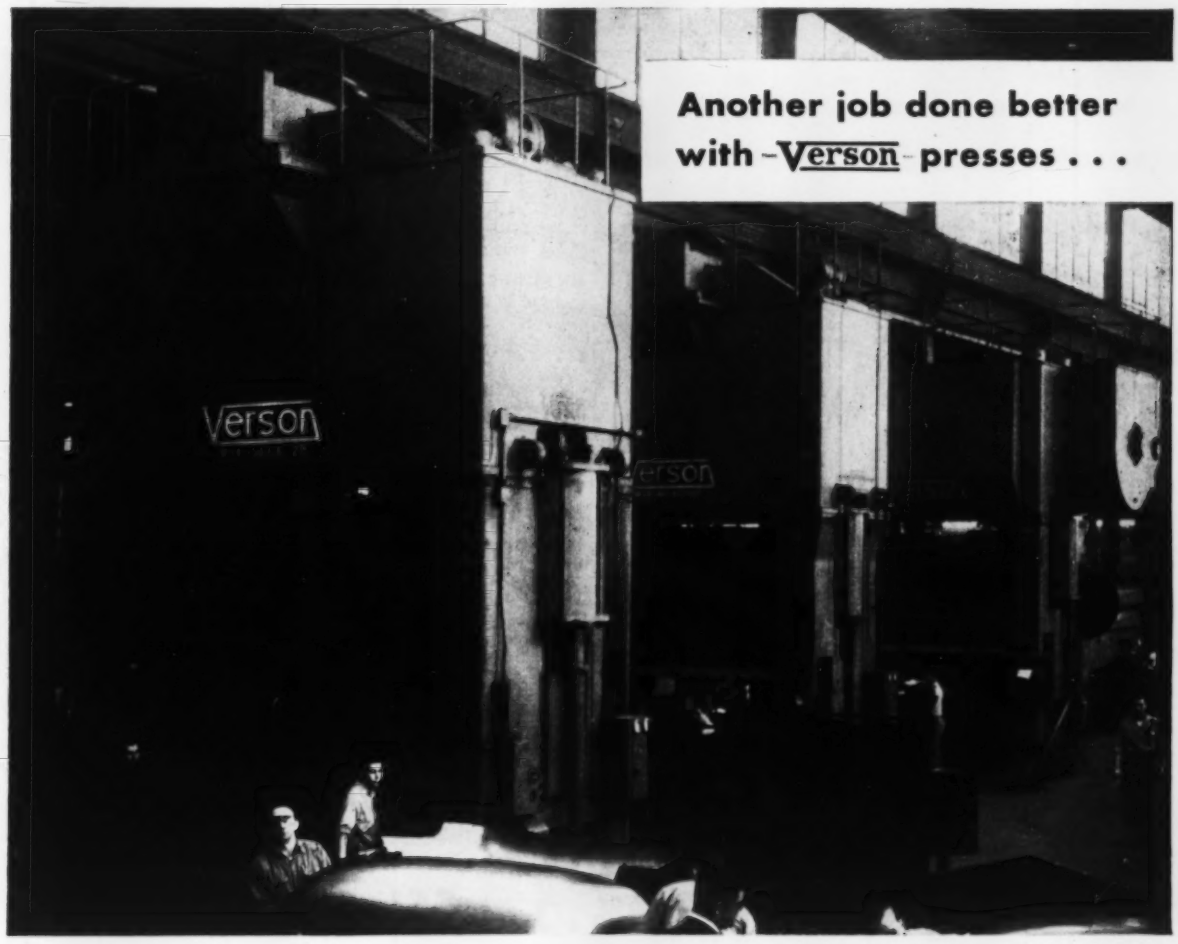
The Carboloy Department of General Electric, manufacturer of permanent magnets, notes with attendant alarm that gambling persons have been field testing its products. Carboloy "separator" magnets, designed for legitimate screening of non-magnetic materials on conveyor lines, have become very popular with small time roulette croupiers.

With magnets on the job, it has been reported these artists can control every movement except the customer's eyeballs. It has been reported, too, that three tinhorns picked up in Nashville for outwitting a pinball machine with a magnet found they had a magnetic revenge, even in defeat: they magnetized the arresting officer's watch!

The possibilities appear unlimited. Just for a start, imagine what you could do at a race track when the horse you DIDN'T bet on comes bounding past. A quick flash of the magnet at flying horseshoes slows down the threat, and the tired beetle carrying your bundle gets another chance to catch up. Anybody for Bowie, Santa Anita or Jamaica?

Shrdlu

(Metalworking Outlook—Pages 45, 46)



This -Verson- line-up turns out truck cab tops for Morrison Steel Products, Inc.

Typical of the countless routine jobs that are being done better every day with Verson Presses are the truck cab tops manufactured by Morrison Steel Products, Inc. Buffalo, New York. In the line-up shown above are two Verson four point full eccentrics rated at 750 tons and 400 tons and a Verson two point full eccentric of 750 tons capacity.

Nothing outstanding about this installation?

No, except that like so many manufacturers doing routine jobs, Morrison Steel Products has taken advantage of Verson's high standards of performance and economy. For the manufacturer this means better stampings at lower overall cost. This is proved by experience on all kinds of jobs over a period of a third of a century.

Whatever your press needs, whether the job is routine or one-of-a-kind, it will pay you to put Verson's experience and know-how to work for you. Catalog G-52 summarizes the complete Verson line and gives typical specifications. Write for your copy, today. There is no obligation on your part.

A Verson Press for every job from 60 tons up.

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ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

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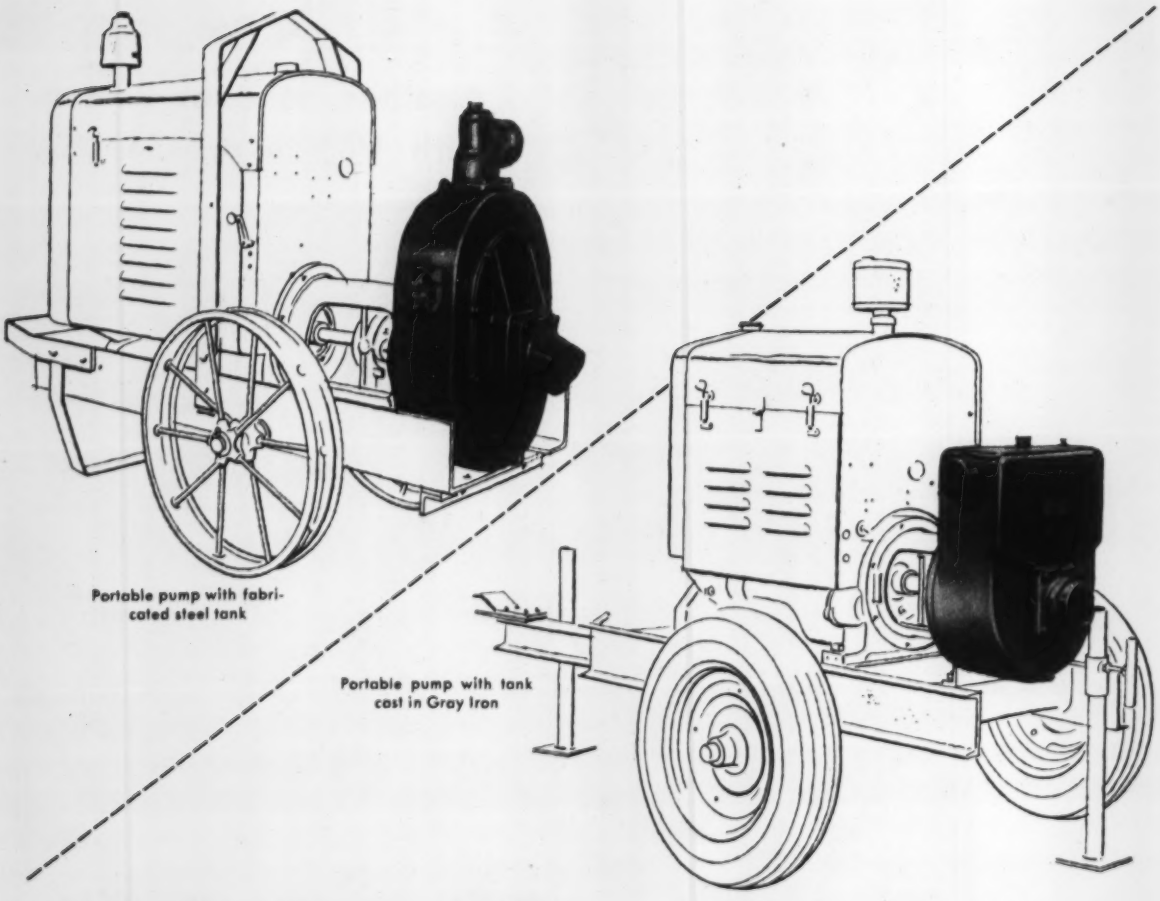

Portable pump with fabricated steel tank

Portable pump with tank cast in Gray Iron

Costs down 20%... efficiency up with GRAY IRON!

This Marlow portable self-priming centrifugal pump originally was made with a fabricated steel pump tank. In modernizing the unit the manufacturer redesigned the tank for production in Gray Iron, thus realizing a *20% saving in costs* . . . as well as substantially increased efficiency over the fabricated tank previously used.

This same type of cost-saving story may be told about some of your fabricated parts, if you take the time to consider the many advantages of the Gray Iron casting process. Write for technical information.

GRAY IRON CHARACTERISTICS INCLUDE:

CASTABILITY
STRENGTH
RIGIDITY
LOW NOTCH SENSITIVITY
WEAR RESISTANCE
HEAT RESISTANCE
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75% of all cast metal products are Gray Iron

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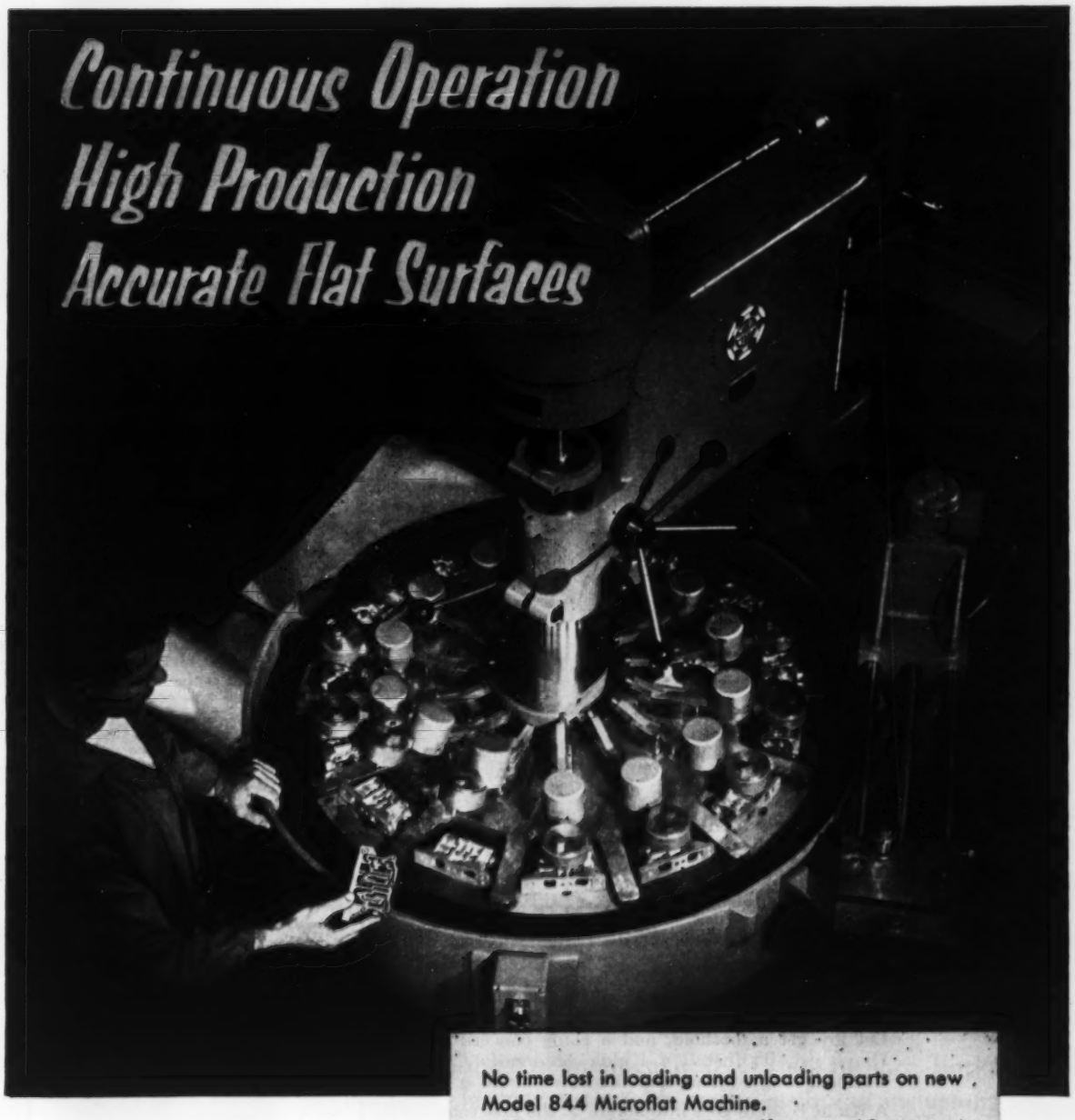
Continuous Operation
High Production
Accurate Flat Surfaces



No time lost in loading and unloading parts on new Model 844 Microflat Machine.

New type multiple-station, self-actuated fixture and more selective controls give this machine a production capacity of a finished part every 3 seconds.

For complete description of this new Microflat Machine write for CROSS-HATCH, Vol. 6, No. 1.

1929 • 1954 — 25TH YEAR OF DEVELOPMENT — PRECISION PRODUCTION THROUGH RECONDITIONING — MICRO MATIC

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A Kidde System goes into action at the first sign of fire —releases clouds of CO_2 over the blaze, smothers fire almost as soon as it starts. And CO_2 leaves no mess to clean up later. It puts out the fire, then vanishes.

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LETTERS
TO THE EDITORS

Packaging Costs Questioned

Your Program for Management article, "Integrate Your Distribution" (June 21, p. 113), was interesting, helpful and timely.

But I take issue with a statement on p. 120, "Most packaging usually costs less than 0.1 per cent of the total price of the product."

Hitch up your trousers and run that off on your slide rules again, boys. A tube of toothpaste costs say 50 cents. The tin in the tube is worth more than 1 cent. The tube must be extruded, printed. Then add cap, filling closure

and box. Surely this brings the cost up to 4 or 5 per cent—40 or 50 times the amount in the statement quoted.

A bottle of Coca-Cola costs the consumer 6 cents. Both Mr. Coca and Mr. Cola would be overcome with joy to be able to purchase a bottle, cap and one twenty-fourth of a case to ship it in for .006 cent.

Seriously, though, the cost of packaging, especially that designed for impulse buying or point-of-sale display, often represents a ridiculously high proportion of the total product cost, especially when the customer usually throws this package away.

We will soon market an item whose final price is $40. The display carton alone costs $1.25. Then there is a protective corrugated box and a corrugated box holding the individual boxes, bringing the total to over 4 per cent.

The rough handling of products in transit calls for stronger and stronger packaging. Indeed, we have found that if we can make products strong enough to stand shipment across the country they will stand all the abuse the customer could ever give them!

Fred W. Moore
Greenfield, Mass.

• *You are correct in pointing out a toothpaste tube costs far more than a mere 0.1 per cent of the price of the product. And the same goes for a host of other consumer items. But in the case of many industrial products the packaging costs are even less than 0.1 per cent. We would have been more accurate if we had said, "average packaging" instead of "most packaging."* —*ED.*

Freight Absorption Comments

This is to compliment you on your "Windows of Washington" article on freight absorption (July 5, p. 36).

I am glad to see that one editor has not shut his eyes to the fact that just

(Please turn to page 12)

With SILICOMANGANESE . . .

. . . It's always a TRIPLE PLAY!

Silicomanganese is one of the most economical and efficient furnace blocks and deoxidizers. It produces cleaner steels with well distributed inclusions . . . assures good manganese recovery . . . and saves furnace time due to low melting point, low carbon content and fast solubility. An ideal manganese addition to the ladle.

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- SPECIAL BLOCKING 50% FERRO - SILICON
- SILICON METAL
- HIGH CARBON FERRO-CHROME
- LOW CARBON FERRO-CHROME SILICON
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- SILICO-MANGANESE
- BOROSIL
- SIMANAL
- RARE EARTH ALLOYS
- LOW CARBON FERROCHROME

Briquets

- SILICON
- MANGANESE
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- CHROME

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LEAK TEST TANK

TWO COMPARTMENT DEHYDRATION OVEN

FOUR COMPARTMENT DEHYDRATION OVEN

EXIT OF 4 STAGE HI-PRESSURE CLEANING UNIT

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Whatever your plans or needs may be for Finishing Systems, Drying and Baking Ovens, Industrial Washing Equipment or Dust Collecting Systems, PETERS-DALTON engineers are ready and able to offer the solution. Recognizing the importance of space conservation, Peters-Dalton engineering starts from plant layout to the ultimate installation of the right type of equipment pertinent to each particular plant . . . not "off the shelf" equipment—BUT tailor-made for the job.

ENTRANCE & EXIT TO UPPER DECK PRIME OVEN ON ROOF OF 7 STORY BUILDING

Typical of Peters-Dalton planned engineering are the photographs shown here. They present some of the P-D installations in a multi-storied eastern manufacturing plant. Here, versatility was required—versatility such as P-D know-how and ability to install for proper functioning such varied components as: dehydration ovens, leak test tanks, power spray washers and baking ovens. Efficient and time-saving, these P-D units are in operation on various floors of this plant, to and including a space conserving roof top installation.

DOUBLE DECK ROOF OVEN

Versatility such as this demonstrates P-D ability to take over your plant-wide problems . . . accept the responsibility until *production-ready*—to engineer the layouts, designs and installations up to complete Finishing Systems. Call with confidence upon P-D to solve your problems . . . meet your needs. Just write, wire or phone.

Hydro-Whirl Paint Spray Booths *Industrial Washing Equipment*
Drying and Baking Ovens *Hydro-Whirl Dust Collecting Systems*

Peters-Dalton INC.
17892 Ryan Road • Detroit 12, Michigan

LETTERS

(Concluded from page 10)

because we have an administration that is friendly to business now is no sign that the pinkos won't try to slip something over on the free competition boys.

Lowell B. Mason
commissioner
Federal Trade Commission
Washington

More About Hot Spraying

We would like to know if the process described in "You Can Do More With Hot Lacquer" (June 21, p. 126) can be extended to include the use of enamels and, further, if enamel can be used must it still be baked to obtain the correct finish.

The article was very thought provoking and in examining our painting operations we find that additional information will be useful in determining the value of this new process in our particular application.

George H. Shyrock
Planning Section
Fractional Horsepower Motor Department
General Electric Co.
Linton, Ind.

• *The hot spray process can be used with enamel, and baking is required.—ED.*

Guide Interest: Snowballing

We wish to compliment you on your "Guide for Steel Buyers." You have done a very thorough job on it.

J. F. Land
general manager of sales
Alan Wood Steel Co.
Conshohocken, Pa.

Information contained in your "Guide for Steel Buyers" will be of great value to our personnel. Please send six copies.

F. A. Haynes
district sales manager
Jones & Laughlin Steel Corp.
Louisville, Ky.

Please send six copies . .

D. B. Mancke
office manager
Bethlehem Steel Co.
Bethlehem, Pa.

Please send copies to our overseas offices listed . . .

Miss M. Hogan
Library
U. S. Steel Export Co.
New York

Please send six copies . . .

Oscar Mezey
Mezey Agency Inc.
Detroit

Congratulations on a fine job . . .

E. H. Trigg
Tredegar Co.
Richmond, Va.

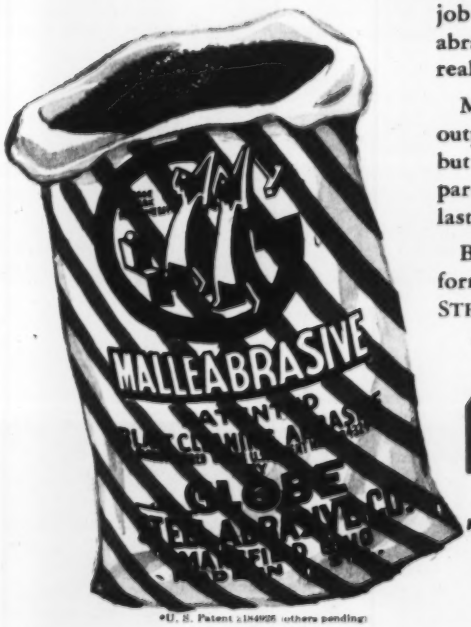
We have just received your "Guide for Steel Buyers."

Mentioned on the front cover are guides for stainless steel. We would appreciate receiving two copies of the guide covering the stainless.

Jerome M. Badner
controller
Automatic Methods Inc.
Elizabeth, N. J.

• *Copies have been sent.—ED.*

HOW TO PUT THE SQUEEZE ON BLAST CLEANING COSTS



*U. S. Patent 2,184,926 (others pending)

More and more shop foremen . . . superintendents . . . men whose job is getting work out fast at less cost, are replacing their old abrasive with Malleabrasive. And they're finding that Malleabrasive really puts the squeeze on blast cleaning costs!

Malleabrasive cleans perfectly—leaves a gleaming finish. Your output is increased because not only does Malleabrasive clean faster but it saves down-time. And your costs go down . . . you have fewer parts replacements, less maintenance. What's more, Malleabrasive lasts longer, which means fewer abrasive purchases.

But why talk about it? Try it and see for yourself. For more information or the name of your nearest distributor, write to GLOBE STEEL ABRASIVE CO., Mansfield, Ohio.

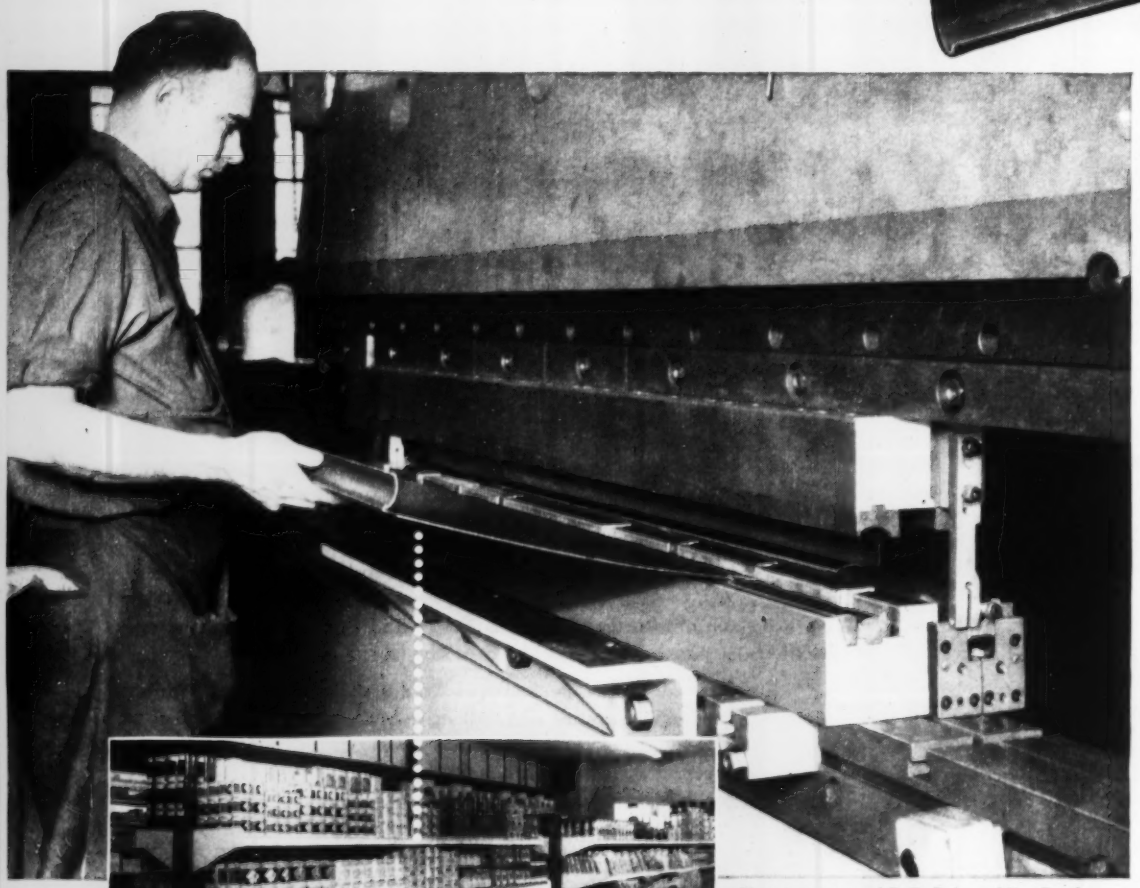
"If you use metal abrasive, you *should* use Malleabrasive."

MALLEABRASIVE®

MADE BY THE GLOBE STEEL ABRASIVE CO., MANSFIELD, OHIO

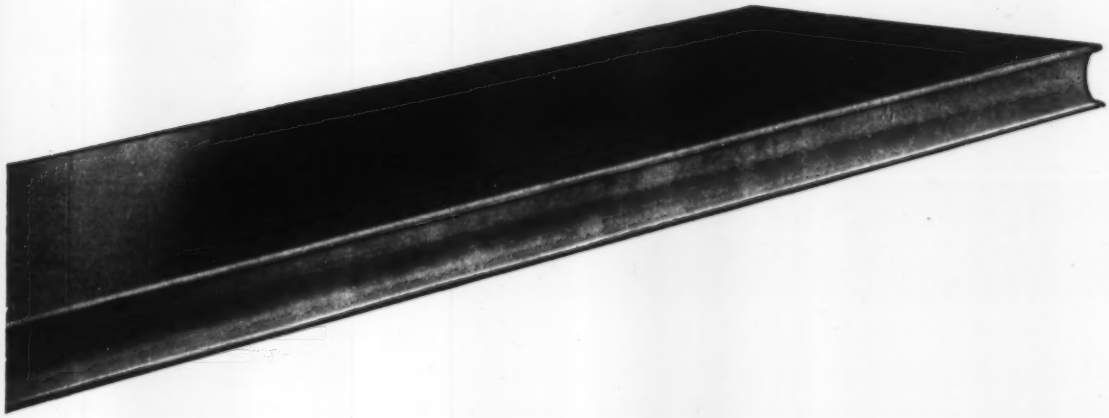
World's largest manufacturers of Malleablized Chilled Iron Shot and Grit
Established 1907

Only accurate forming



Photos courtesy of E. O. Bulman Mfg. Co., Inc., Grand Rapids 2, Michigan.

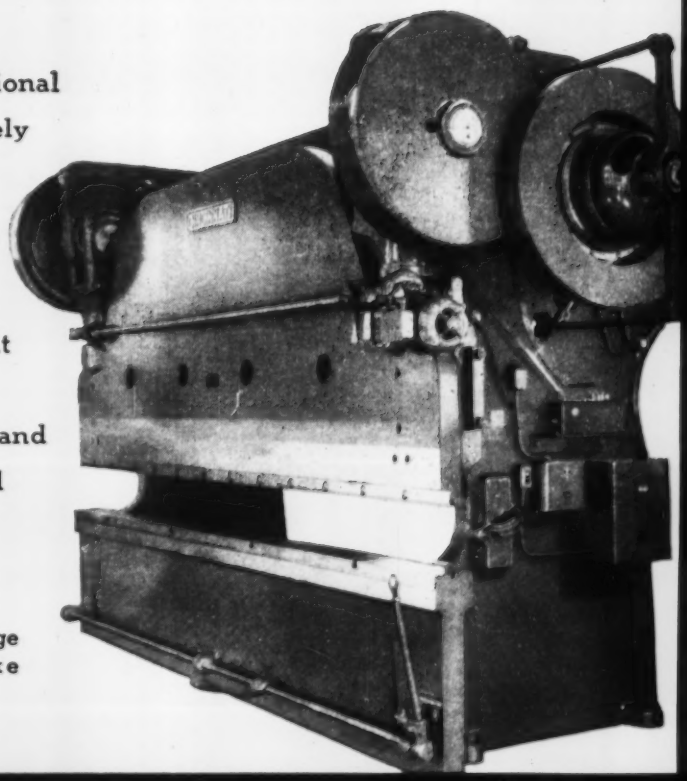
Note the clean straight lines of the moldings formed on the Cincinnati Press Brake.



...could solve this problem

The long steel shelves of these sectional display racks are formed so accurately that sections match perfectly with lines straight and clean.

The Cincinnati Press Brake is forming to such close tolerances that a masking strip previously used is eliminated. A production increase and no discards has materially reduced costs while product was improved.

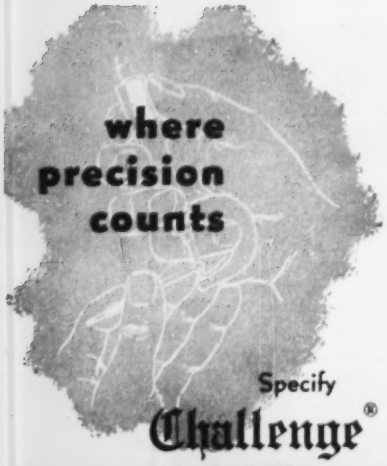


Write for the New 72-Page Cincinnati Press Brake Catalog.

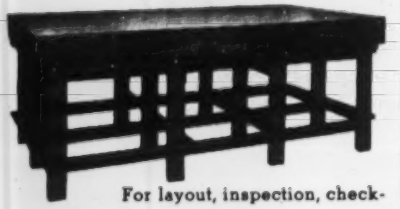
THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

CINCINNATI

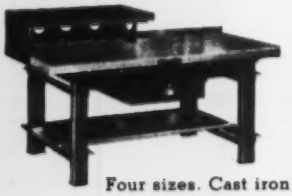


Specify
Challenge®



For layout, inspection, checking, lapping, assembly and welding operations . . . depend on the accuracy and stability of Challenge Precision Equipment. Mail coupon for information on Layout Surface Plates . . . Clamp Edge Layout Plates . . . Reading Tables . . . Lapping Plates . . . Welding Tables . . . Surface Plates . . . Bench Plates . . . Surface Plate Equipment.

Challenge Work Benches . . .



Four sizes. Cast iron top, two inches thick. Welded steel supports, tool box shelf, steel drawer with lock.

Challenge

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THE CHALLENGE MACHINERY CO
GRAND HAVEN, MICHIGAN

The Challenge Machinery Co.
Grand Haven, Michigan

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☐ Surface Plate Equip. ☐ Welding Tables
☐ General Catalog

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Full address _____

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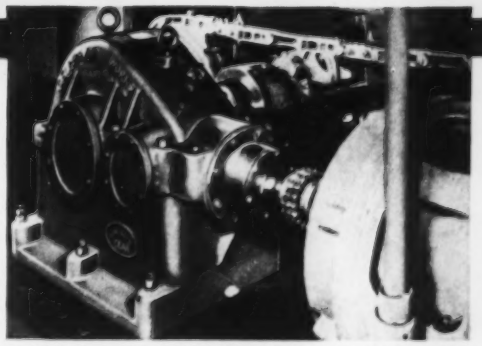
The sturdy, compact construction of this widely used Philadelphia Spiral Bevel-Helical Unit is evident from an examination of the above illustration . . . the balanced arrangement of the gears; the anti-friction bearings, designed to take combined radial and thrust loads; the rugged pinion and gear shafts which are finished to close tolerances by grinding; the generous sized housing that provides an adequate oil reservoir and large radiating surface for thermal capacity.

Philadelphia Units have built-in satisfaction, and are available in ratios as low as 1 to 1, with horizontal right or left hand output shafts; or Up and Down Vertical Shafts.

Be convinced — send for 58 page Catalog SB-50 which illustrates and describes Philadelphia Spiral Bevel Speed Reducers.



A Philadelphia Spiral Bevel-Helical Reducer driving a Flight Conveyor; 30 hp at 850 rpm; reduction ratio 10 to 1.

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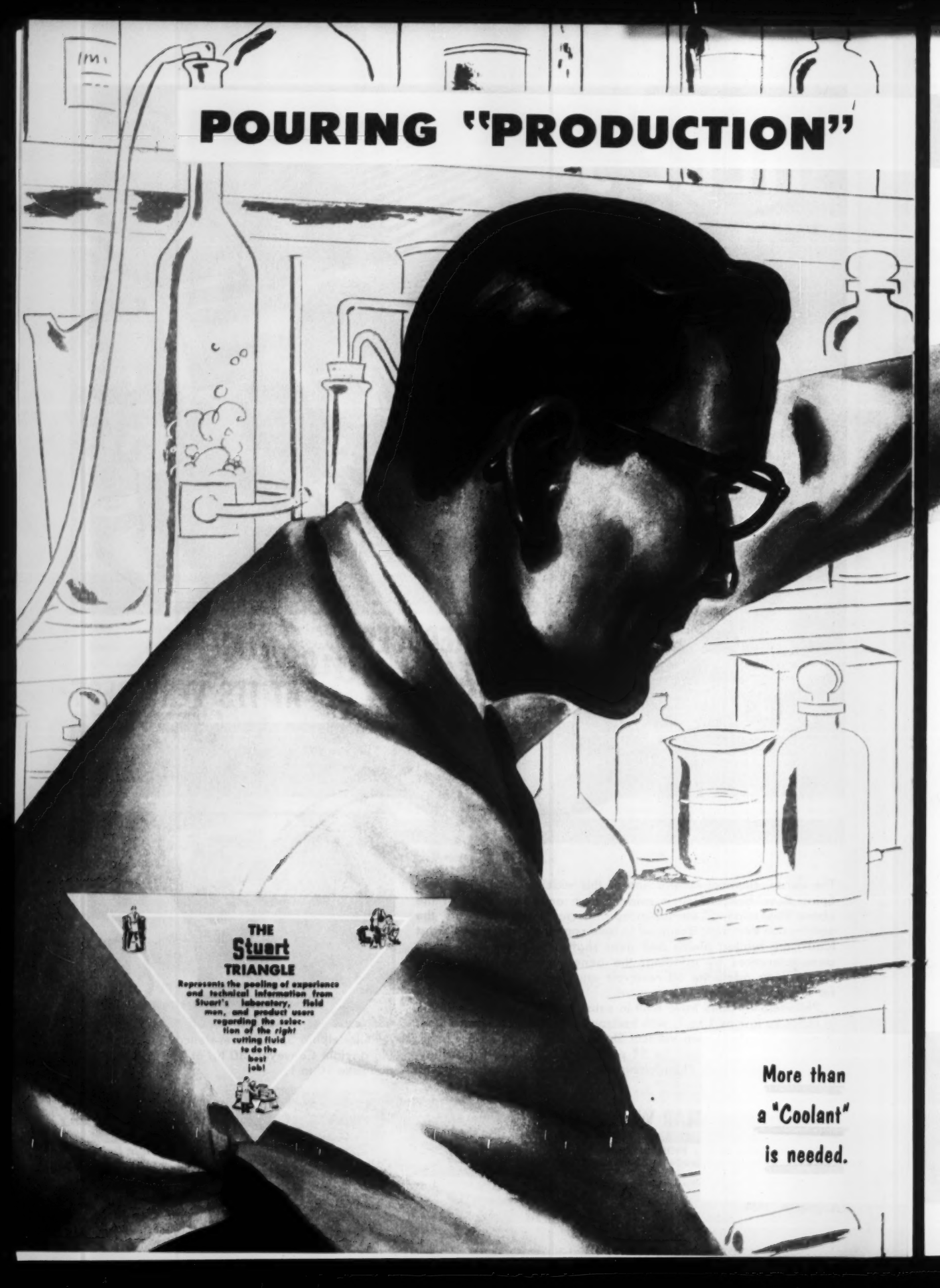
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More than
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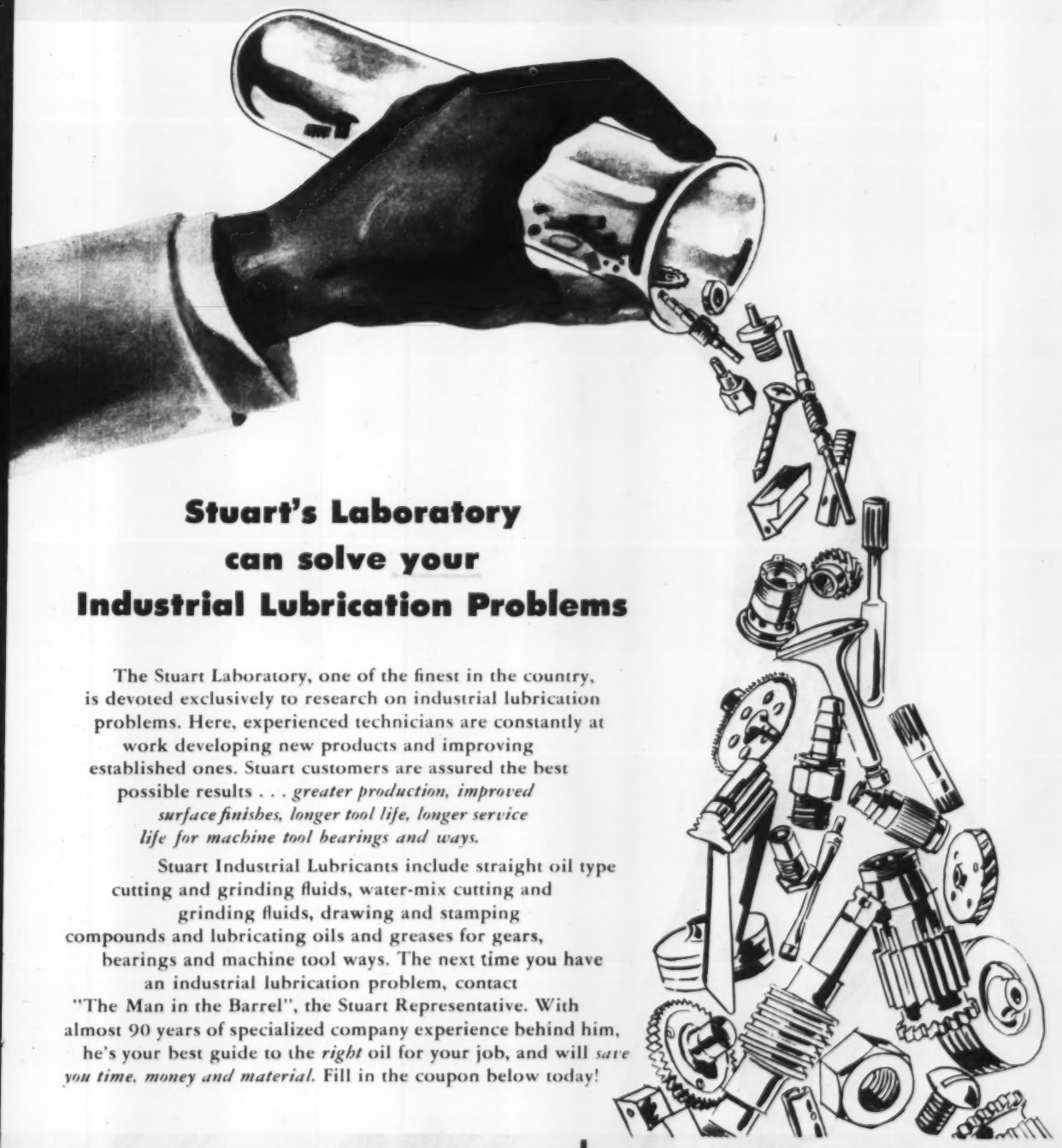

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The Stuart Laboratory, one of the finest in the country, is devoted exclusively to research on industrial lubrication problems. Here, experienced technicians are constantly at work developing new products and improving established ones. Stuart customers are assured the best possible results . . . *greater production, improved surface finishes, longer tool life, longer service life for machine tool bearings and ways.*

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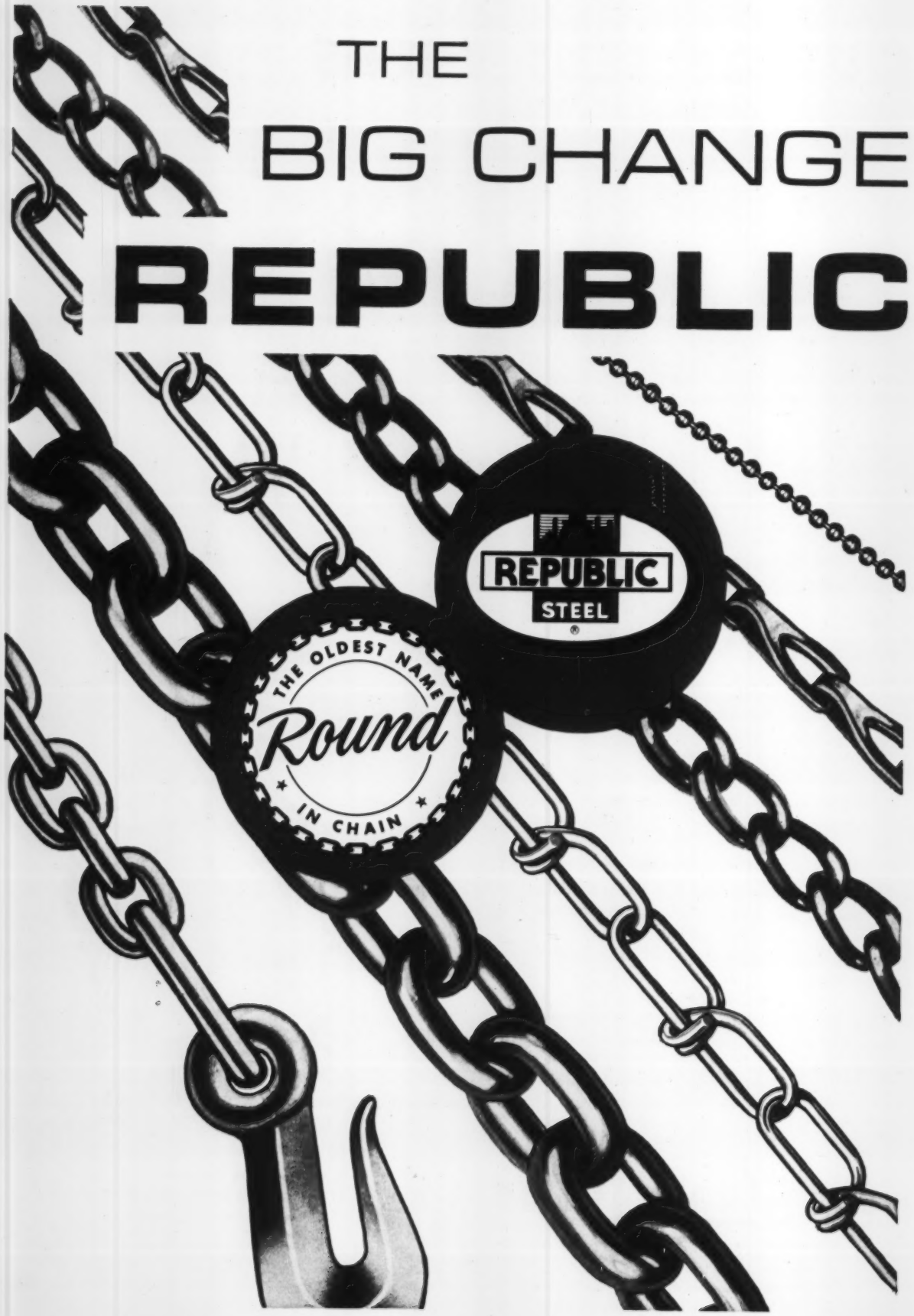
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Round CHAIN

Round, the oldest name in chain, now joins Republic Steel, producer of the world's widest range of steels and steel products.

The Round Chain plants and warehouses now become the Round Chain Division of Republic Steel Corporation.

Your orders for REPUBLIC Round CHAIN will be handled promptly and efficiently through a central sales organization. Manufacturing plants and warehouses are strategically located in leading cities throughout the United States to assure you of prompt delivery.

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Integration of Round manufacturing facilities with Republic's experience in producing all types of steels assures you of the highest quality chain products.

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HOW LINDBERG STEEL TREATING COMPANY HELPS MOW YOUR LAWN

Gus Stuart next door . . Tom Dougherty down the street . . and Harry Van Hook in the next town are taking it easy.

For these lazy, lucky critters live in the era of the power lawn mower . . they just give it the gun, and zoom . . a beer-and-a-half later the yard is mowed, slick as a whistle.

We're not about to tell you Lindberg Steel Treating Company is solely responsible for the power lawn mower industry. That isn't exactly the case. But, along with dozens of designers, engineers, and production men, we kicked in our two cents worth.

Quite a few power lawn mowers have cast aluminum shells . . one of them is the "Lawn-Boy" made by *Outboard Marine & Manufacturing Company**. "*Outboard*" needed mold dies to produce these mower shells . . and the dies had to be heat treated. They were intricate, had plenty of irregular sections, and they were worth $15,000.

The highly polished surface finish had to be maintained. Critical dimensions had to be held. There could be no carb or decarb, because surface cracking or "orange peeling" would result. Brinnel hardness had to be held to a narrow range. And there could be no variation in hardness uniformity.

So the job was turned over to heat treating specialists . . metallurgical engineers of Lindberg Steel Treating Company. They determined the proper cycle for preheating, soaking, cooling, and tempering.

91 short hours after delivery to Lindberg, the dies were ready to produce aluminum mower shells. Heat treating is easy . . *if* you do the *right* thing, at the *right* time, in the *right* equipment, in the *right* way. We specialize in doing heat treating . . *right*. Call us.

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* *RPM Manufacturing Company Division*

A case history of Lindberg Steel Treating Co. service to American industry

LINDBERG STEEL TREATING CO.

1973 North Ruby Street, Melrose Park (Chicago) Ill. Phone: Fillmore 4-4080

CALENDAR
OF MEETINGS

August 16-18, Society of Automotive Engineers Inc.: National West Coast meeting, Hotel Statler, Los Angeles. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

August 19-20, American Management Association: Briefing session on the new tax law, Hotel Statler, New York. Association address: 330 W. 42nd St., New York. Vice president-secretary: James O. Rice.

August 25-27, Western Electronic Show & Convention: Pan Pacific Auditorium and Ambassador hotel, Los Angeles. Business manager: Mal Mobley Jr., 344 N. La Brea Ave., Los Angeles 36.

August 30-September 3, Automotive Electric Association: Annual fall meeting, Vanas Springs hotel, Vanas Springs, Alberta, Canada. Association address: 802 Michigan Bldg., Detroit. Executive secretary: S. W. Potter.

September 1-16, International Electrotechnical Commission: Golden jubilee meeting, University of Pennsylvania, Philadelphia. Information: D. E. Denton, Public Relations Dept., American Standards Association, 70 E. 45th St., New York 17.

September 4-8, Pressed Metal Institute: Annual fall meeting, Manoir Richelieu hotel, Murray Bay, P.Q., Canada. Institute address: 2860 E. 130th St., Cleveland. Managing director: O. B. Werntz.

September 7-9, Industrial Truck Association: Fall meeting, Greenbrier hotel, White Sulphur Springs, W. Va. Association address: Washington Loan & Trust Bldg., Washington 4. Secretary: William Van C. Brandt.

September 7-9, National Fluid Power Association: Fall meeting, Hotel Commodore, New York. Association address: 1618 Orrington Ave., Evanston, Ill. Secretary: Barrett Rogers.

September 8-10, American Society of Mechanical Engineers: Fall meeting, Schroeder hotel, Milwaukee, Wis. Society address: 29 W. 39th St., New York. Secretary: C. E. Davies.

September 8-10, Porcelain Enamel Institute Inc.: Shop practice forum meeting, Urbana-Lincoln hotel, Urbana, Ill. Institute address: 1346 Connecticut Ave. N.W., Washington 6. Secretary: John C. Oliver.

September 8-10, National Bureau of Standards: Conference on cryogenic engineering, NBS-AEC cryogenic engineering laboratory, Boulder, Colo. Information: M. M. Reynolds, chairman of the conference, NBS Boulder Laboratories, Boulder, Colo.

September 10-11, Metal Powder Association: Fall closed meeting, The Homestead, Hot Springs, Va. Association address: 420 Lexington Ave., New York 17. Secretary: Robert L. Ziegfeld.

September 11-14, Packaging Machinery Manufacturers Institute: Annual meeting, Grove Park Inn, Asheville, N. C. Institute address: 342 Madison Ave., New York 17. Secretary: Miss Helen L. Stratton.

September 12-15, National Metal Trades Association: Eastern plant management conference, Sagamore hotel, Lake George, N. Y. Association address: 122 S. Michigan Ave., Chicago 3. Secretary: Charles L. Blatchford.

September 12-17, American Chemical Society: Fall meeting, Statler hotel, New York. Society address: 1155—16th St. N. W., Washington 6. Executive secretary: Alden H. Emery.

September 13-14, American Coke & Coal Chemicals Institute: Annual meeting, The Homestead, Hot Springs, Va. Institute address: 711 14th St. N.W., Washington 5. President: Samuel Weiss.

September 13-15, Allied Railway Supply Association: Annual meeting and exhibit, Hotel Sherman, Chicago. Association address: 1200 W. Chase Ave., Chicago 26. Secretary: C. F. Weil.

September 13-16, Society of Automotive Engineers Inc.: National tractor meeting and production forum, Hotel Schroeder, Milwaukee. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

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This fine, burr-free herringbone knurl provides a sure, non-skid grip for faster assembly.

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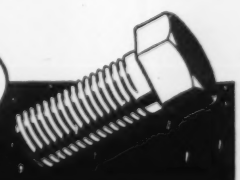

Precision Screw Products, Parts and Assemblies Since 1873

TO THE FOUR CORNERS

OF THE WORLD

Aerial view of the Kansas City, Kansas, Works, Fairbanks, Morse & Co., 3601 Kansas Avenue.

...from Kansas City

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As a major supplier of quality pumping equipment, it is particularly suitable that this new Fairbanks-Morse plant be located at an important crossroads of the world . . . Kansas City. In this new plant 190,000 square feet of manufacturing space and a complete foundry occupying 150,000 square feet are devoted to bringing better service to our customers all over the world.

Modern manufacturing, development and testing equipment backed by engineering and production skills of highly trained personnel combine to produce products of unmatched quality . . . in performance, durability, economy. Fairbanks, Morse & Co., Chicago 5, Illinois.

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PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • FARM MACHINERY • MAGNETOS

Tube Application Adds New Beauty—Utility to New Car!

America's newest and most beautiful sports car—manufactured by the Nation's outstanding builder of fine cars—possesses new beauty and new utility because of a new application of Carpenter Stainless Tubing.

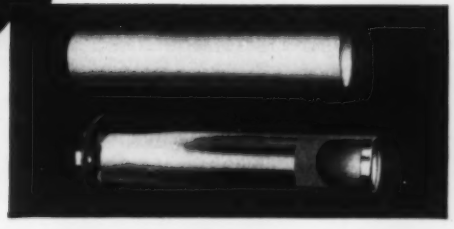
The twin tailpipes of this road-eating example of the automotive art are made from Carpenter Stainless. They resist the corrosive action of exhaust acids and corrosive atmospheres—stay bright—stay beautiful.

What's more, they are easy to fabricate. Although 10 separate steps are required to produce the finished part from the raw tube, swaging, rolling, cutting, spot welding and polishing are all accomplished without trouble.

Your fabrication, design or production problems may not be exact parallels to those outlined here . . . but whatever they are you may be sure that Carpenter Stainless Tubing *quality* can help solve them. For complete information consult your nearest Carpenter Distributor or write direct for your copy of the new Carpenter Condensed Data Bulletin.

The Carpenter Steel Company, Alloy Tube Division, Union, N.J.
Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Shown below are original tubing and a completed tailpipe assembly after ten fabricating and assembly operations.



Carpenter

Stainless Tubing & Pipe

More than meets the eye

P-K Socket Screws, at a glance, may look substantially like the make you buy through habit. It's easy to conclude that all such fasteners are simply "screws with hex sockets." You have to "look beyond the hex" for the difference.

If you don't, you are buying with a "blind spot" that blocks your way to *proved* benefits other buyers use to advantage.

Parker-Kalon's exacting Quality Control is only one of the advantages you don't see until you "look beyond the hex."

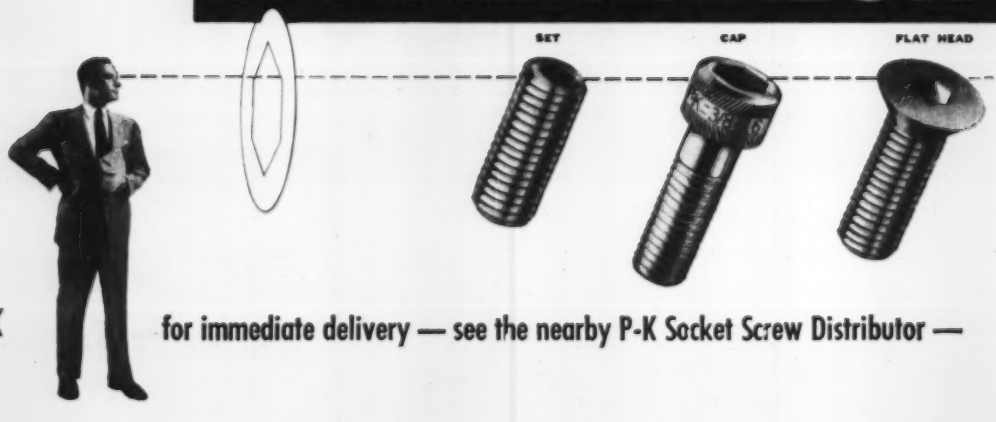
Look Beyond the Hex

Compare every detail of product and service. Compare for advanced design that speeds assembly . . . for proved assembly strength. Compare planning and buying aids, and supply service. Get all the facts, and try P-K Socket Screws. You'll find they take top rating in every test.

For cost-wise assembly, you need all the advantages offered only by P-K. Why miss any of them? Get samples, information from your P-K Distributor, or write: Parker-Kalon Division, General American Transportation Corporation, 200 Varick St., New York 14.

for Guaranteed Quality gaged to most exacting needs

PARKER-KALON®



IN STOCK for immediate delivery — see the nearby P-K Socket Screw Distributor —

P-K QUALITY CONTROL

begins with tests of all wire — continues through visual screening of *all* screws. The finest apparatus aids skilled senses of technicians and inspectors . . . no defect escapes detection.

Four of the many steps in the exacting routine are illustrated at the left. Above, the metallograph test to check metal structure, and the test to determine ductility and strength under tension loads. Below, the pilot furnace for testing heat-treatment procedures, and the Magnaflux inspection, employing "black light" to reveal any defects.

FOR ADVANCED DESIGN that speeds assemblies — makes them simpler, stronger — and saves errors.

FOR ASSEMBLY STRENGTH okayed in a million punishing tests by thousands of satisfied users.

FOR PLANNING AIDS and buying data patterned to your special needs, plus advice on assembly.

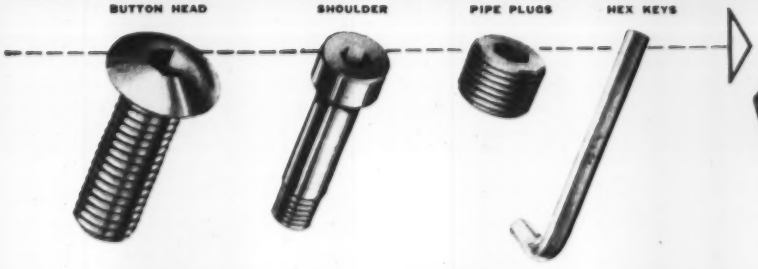
FOR SUPPLY SERVICE set up for fast action and lower purchasing expense — by local Distributors.

FOR ANY STYLE OR SIZE You'll find any Socket Screw you need in P-K's complete line. Hex Keys in all sizes, and several handy sets.

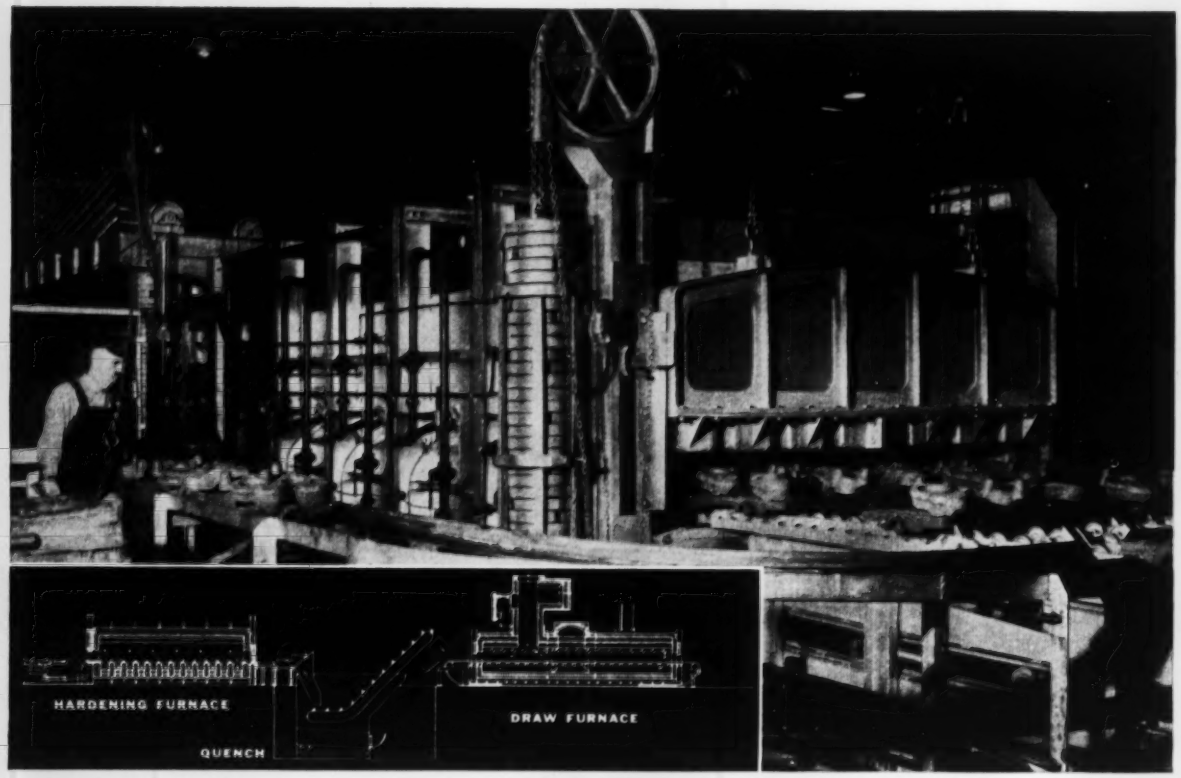
GET ALL
THESE ESSENTIALS OF
COST-WISE ASSEMBLY
GET P-K

SOCKET SCREWS

BUTTON HEAD SHOULDER PIPE PLUGS HEX KEYS



your local Supply and Service Specialist



NO REJECTS IN 6 MONTHS!

direct-fired automatic furnace line handles over 3,000 lbs./hr. of varied production

Let's repeat that. Not a reject in 6 months—even when customers requested more uniform microstructures in steel forgings, and faster delivery, from this big job shop. In addition, they achieved lower unit, operating, and labor costs with more versatile production . . . all in their 'Surface'-built automatic heat treat line. This line is a fine example of the advantages of 'Surface' direct-fired furnaces and furnace equipment:

UNIFORM QUALITY. Brinell readings on samples from the hardening and draw furnaces have been extremely consistent with close tolerances.

HIGH PRODUCTION. Actual production rate has been as high as 3,600 lbs./hr. of work, heated from cold to 1550F—even better than design capacity.

LOW OPERATING COST. Combustion efficiency stems from 'Surface' automatic proportioning, one-valve burners.

LOW LABOR COST. The photo shows part of the conveyor system which enables one man to run the whole line. Formerly, the job required 3 men.

The high-temperature convection draw furnace on this line has an operating range of 800-1350F, permitting processing of steels ranging from SAE 1041 to SAE 8640.

Write for Literature H54-1; see how these "work-horse" furnaces can pay off for you.

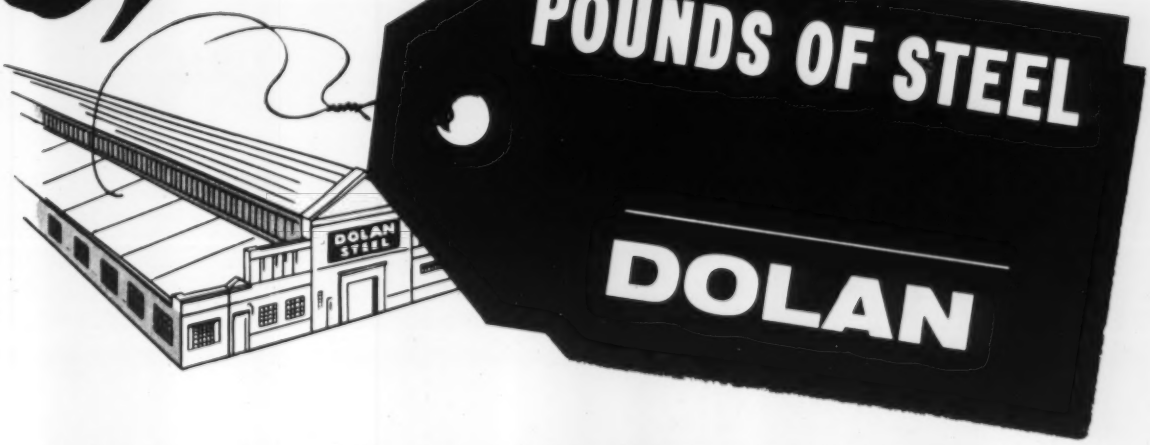
Surface
HEAT TREATING EQUIPMENT

SURFACE COMBUSTION CORPORATION • TOLEDO 1, OHIO

ALSO MAKERS OF *Kathabar* HUMIDITY CONDITIONING *Janitrol* AUTOMATIC SPACE HEATING

"Ready, Willing and Able!"

9,000,000



Dolan's tremendous inventory gives customers these three distinct advantages:

1. **Immediate delivery.**
2. **A wide variety of close tolerance, high grade cold rolled and hot rolled strip and sheet steel in all finishes, tempers and gauges.**
3. **Eliminates customer's need for storage space that can be better used for production machinery.**

Complete facilities for shearing sheet stock up to 3/8" thick . . . slitting coils up to 48" wide . . . always available in stock, thicknesses from .008 to 1/4" — all make it possible for Dolan to keep you supplied with the steel you need, cut to your exact specifications — *competitively priced.*

If you require one complete source for flat rolled steel . . . it should be . . .
If you require several sources for flat rolled steel . . . one of them should be . . .

DOLAN
Steel Company Inc.

810 UNION AVENUE BRIDGEPORT, CONNECTICUT
Phone EDison 5-8173

New "Magic

Speeds Up Service to You through your MORSE-FRANCHISED DISTRIBUTOR

Touch"

Now there's a telegraph office right in the Morse plant! And it can reach, within minutes, any other telegraph office in the country . . . through a new electronically controlled automatic switching system. This is the first installation of its kind in the cutting tool industry . . . one of the first in the world.

And this ultra-modern system has been installed with exactly one idea in mind . . . to enable your Morse-Franchised Distributor to give you faster service than ever on the finest cutting tools made . . . Morse Drills, Taps, Dies and Die Sets, Reamers, End Mills, Counterbores and Milling Cutters. Call him on any cutting-tool problem . . . he has what you need or he can get it, *right now!*

MORSE TWIST DRILL & MACHINE COMPANY

NEW BEDFORD, MASS. • *Warehouses in* New York, Detroit, Chicago, Houston, San Francisco

MORSE

Cutting Tools

Buy them by phone from your Morse Franchised Distributor and save ordering time

YODER *Multiple Rotary* SLITTERS

Big Convenience, yes... but Savings are BIG, too!

Ask any owner of a Yoder slitter. He is apt to mention first the big *convenience* of being able at all times to supply his own needs in slit strands, from a relatively small stock of standard width coils. He no longer has to worry about ordering slit-to-width stock far in advance in order to anticipate production needs; changing production schedules he takes in his stride because he can meet unexpected needs for special widths on a few hours' notice. Since he is independent of outside slitting service he can buy his strip supply wherever he can get the best quality, price and delivery.

All of these conveniences may make him forget to mention the direct saving in dollars and cents which in most instances are big enough to pay for the slitter installation in a year or two, often even less.

The Yoder Slitter Book is a treatise on the mechanics as well as the economics of slitter operation, with time studies, cost analyses, coil handling, scrap disposal, and other useful data. It's yours for the asking.

THE YODER COMPANY
5502 Walworth Ave. • Cleveland 3, Ohio

Complete Production Lines

- ★ **COLD-ROLL-FORMING and auxiliary machinery**
- ★ **GANG SLITTING LINES for Coils and Sheets**
- ★ **PIPE and TUBE MILLS–cold forming and welding**

ENGINEERING YODER MANUFACTURING

Roebling drum packs are shipped on pallets unless otherwise specified. This gives you today's easiest, least expensive method of moving and stacking wire — with a fork truck, one man can do the work of ten.

Packed to save you money!

IN ADDITION to producing top quality high carbon wire, Roebling has developed many special methods of packing ... and some *one* of these, or some other method which may be developed for your specific requirements, may save a considerable amount of time and money in your plant.

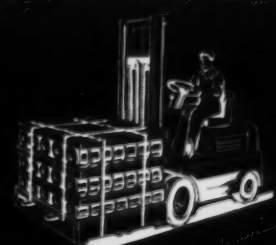
Certain types of wire, for instance, can be packed in hexagonal fibre drum packs that provide superior protection and facilitate handling and storing wire. Drum packs do not have to be returned ... save you bother, storage space and freight charges.

You *pay* for the best when you buy high carbon wire. Make sure you *get* the best, in wire and packing too. Always specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

ROEBLING CF&I

Subsidiary of The Colorado Fuel and Iron Corporation

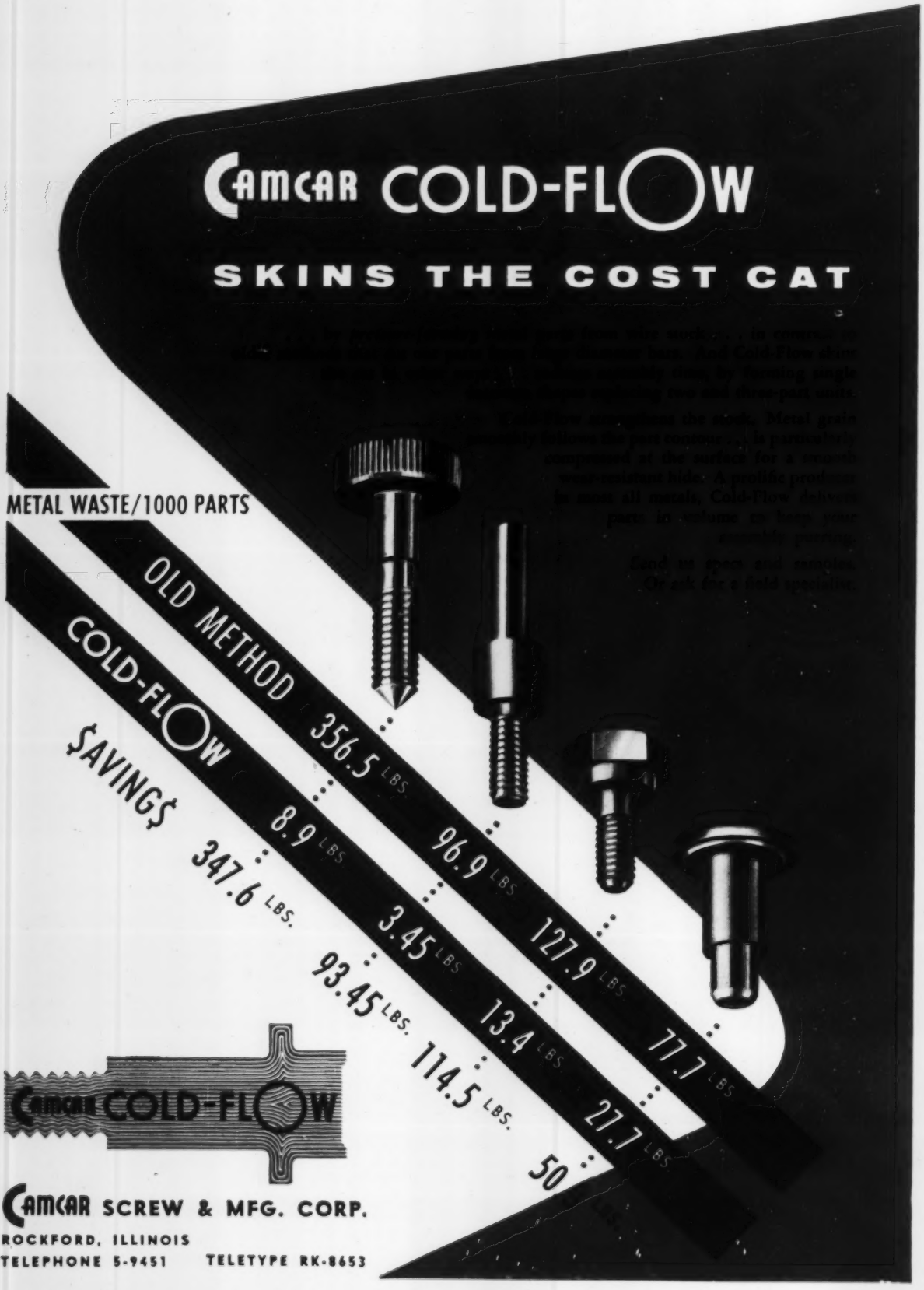
ATLANTA, 934 AVON AVE • BOSTON, 51 SLEEPER ST & 5 PITTSBURGH ST • CHICAGO, 5525 W. ROOSEVELT RD • CINCINNATI, 3253 FREDONIA AVE • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST • DETROIT, 915 FISHER BLDG • HOUSTON, 6216 NAVIGATION BLVD • LOS ANGELES, 5340 E. HARBOR ST • NEW YORK, 19 RECTOR ST • ODESSA, TEXAS, 1920 E. 2ND ST • PHILADELPHIA, 230 VINE ST • ROCHESTER, 1 FLINT ST • SAN FRANCISCO, 1740 17TH ST • SEATTLE, 900 1ST AVE S. • ST. LOUIS, 3001 DELMAR BLVD • TULSA, 321 N. CHEYENNE ST • EXPORT SALES OFFICE, TRENTON 2, N. J.



If you wish, Roebling spools will be delivered on pallets with separators, providing the easiest and most economical means of handling and stacking wire with fork trucks.

CAMCAR COLD-FLOW

SKINS THE COST CAT



CAMCAR COLD-FLOW

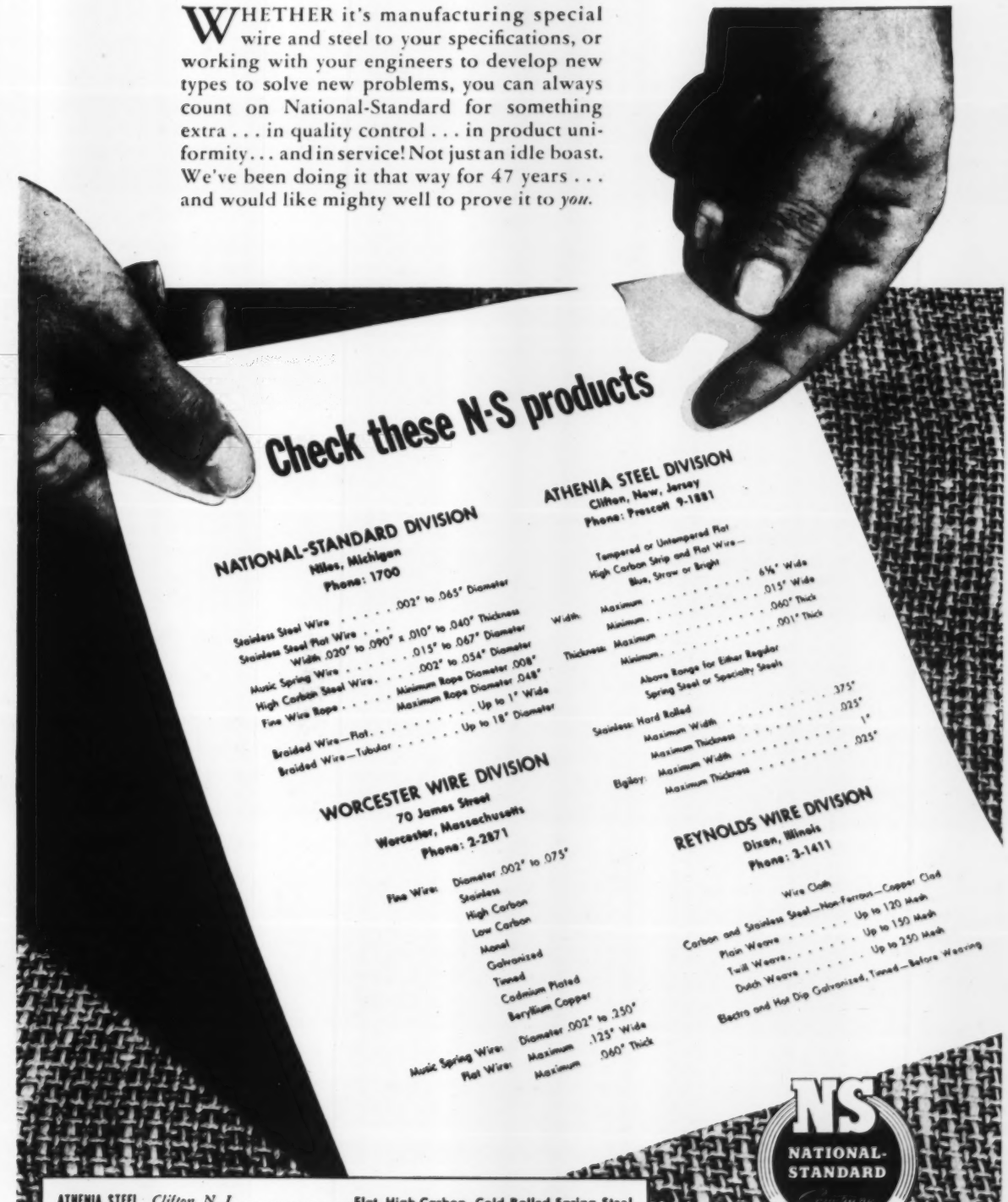
CAMCAR SCREW & MFG. CORP.

ROCKFORD, ILLINOIS

TELEPHONE 5-9451 TELETYPE RK-8653

Need special-purpose wire or steel?

WHETHER it's manufacturing special wire and steel to your specifications, or working with your engineers to develop new types to solve new problems, you can always count on National-Standard for something extra . . . in quality control . . . in product uniformity . . . and in service! Not just an idle boast. We've been doing it that way for 47 years . . . and would like mighty well to prove it to *you*.



Check these N-S products

NATIONAL-STANDARD DIVISION
Niles, Michigan
Phone: 1700

Stainless Steel Wire . . . . . .002" to .065" Diameter
Stainless Steel Flat Wire . . . .
Width .020" to .090" x .010" to .040" Thickness
Music Spring Wire . . . . . .013" to .067" Diameter
High Carbon Steel Wire. . . . .002" to .054" Diameter
Fine Wire Rope . . . . . Minimum Rope Diameter .008"
Maximum Rope Diameter .048"
Braided Wire—Flat. . . . . Up to 1" Wide
Braided Wire—Tubular . . . . . Up to 18" Diameter

ATHENIA STEEL DIVISION
Clifton, New, Jersey
Phone: Prescott 9-1881

Tempered or Untempered Flat
High Carbon Strip and Flat Wire—
Blue, Straw or Bright
Width: Maximum . . . . . 6¼" Wide
Minimum . . . . . .015" Wide
Thickness: Maximum . . . . . .060" Thick
Minimum . . . . . .001" Thick

Above Range for Either Regular
Spring Steel or Specialty Steels

Stainless: Hard Rolled . . . . . .375"
Maximum Width . . . . . .025"
Maximum Thickness . . . . . 1"
Bigsby: Maximum Width . . . . . .025"
Maximum Thickness . . . . . .

WORCESTER WIRE DIVISION
70 James Street
Worcester, Massachusetts
Phone: 2-2871

Fine Wire: Diameter .002" to .075"
Stainless
High Carbon
Low Carbon
Monel
Galvanized
Tinned
Cadmium Plated
Beryllium Copper
Music Spring Wire: Diameter .002" to .250"
Flat Wire: Maximum .125" Wide
Maximum .060" Thick

REYNOLDS WIRE DIVISION
Dixon, Illinois
Phone: 2-1411

Wire Cloth
Carbon and Stainless Steel—Non-Ferrous—Copper Clad
Plain Weave . . . . . Up to 120 Mesh
Twill Weave . . . . . Up to 150 Mesh
Dutch Weave . . . . . Up to 250 Mesh
Electro and Hot Dip Galvanized, Tinned—Before Weaving

NS NATIONAL-STANDARD NILES, MICHIGAN

ATHENIA STEEL.. *Clifton, N. J.*	Flat, High Carbon, Cold Rolled Spring Steel
NATIONAL-STANDARD.. *Niles, Mich.*	Tire Wire, Stainless, Fabricated Braids and Tape
REYNOLDS WIRE.. *Dixon, Illinois*	Industrial Wire Cloth
WAGNER LITHO MACHINERY.. *Jersey City, N. J.*	Metal Decorating Equipment
WORCESTER WIRE WORKS.. *Worcester, Mass.*	Round and Shaped Steel Wire, Small Sizes

DIVISIONS OF NATIONAL-STANDARD CO.
NILES, MICHIGAN

Sure, that old pump still works,

but how much does it cost to keep?

That rugged old pump of yours may not be the bargain that it seems. Let's do some arithmetic. If the efficiency of the old pump is 75% vs. the 85% efficiency of the new pump, you are paying more to keep it than you would to replace it. That's because a new unit of equivalent output uses less power. Thus it soon saves its own cost — then begins to pay dividends.

Let's take a specific example—a general service pump

Old pump efficiency 84%	**625 BHP**
New pump efficiency 89%	**390 BHP**
	35 BHP Saving

On the basis of 1¢ per KWH, the 35 BHP saving for a 5000-hour year (approximately 14 hours per day) amounts to $1300. This saving, capitalized in 4 years at 4% adds up to $5520. Yet the price of the new pump that saves $5520 is only $4054.

What would the pump replacement profit be in your particular case? Your De Laval representative can tell you exactly — in dollars and cents — as soon as he has the basic facts on your present installation. Call him in today or write to De Laval for Pump Fax Bulletin which includes a valuable "power-savings" chart.

DE LAVAL *Pumps*

DE LAVAL STEAM TURBINE COMPANY

860 Nottingham Way, Trenton 2, New Jersey

DL-2170

which of these feed-in duct features *rate highest with you?*

architects

rate these SQUARE D features particularly high:

lowest known voltage drop . . . maximum efficiency, minimum power loss

smallest cross-sectional area . . . conserves valuable installation space

contractors

give these features top billing:

reduced installation time . . . simplified components, factory prefabrication

new joint design *(lower right)* . . . all joint ends identical, connection bolts face outward

interchangeable standard fittings . . . permit horizontal or vertical riser applications

users

vote these SQUARE D features tops:

low cost installation and maintenance . . . most accessible connections

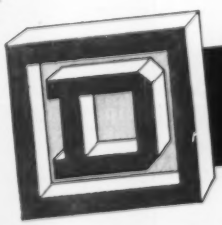
totally enclosed . . . permanent safety construction, excludes dust

completely reuseable . . . rearrangement with the same components

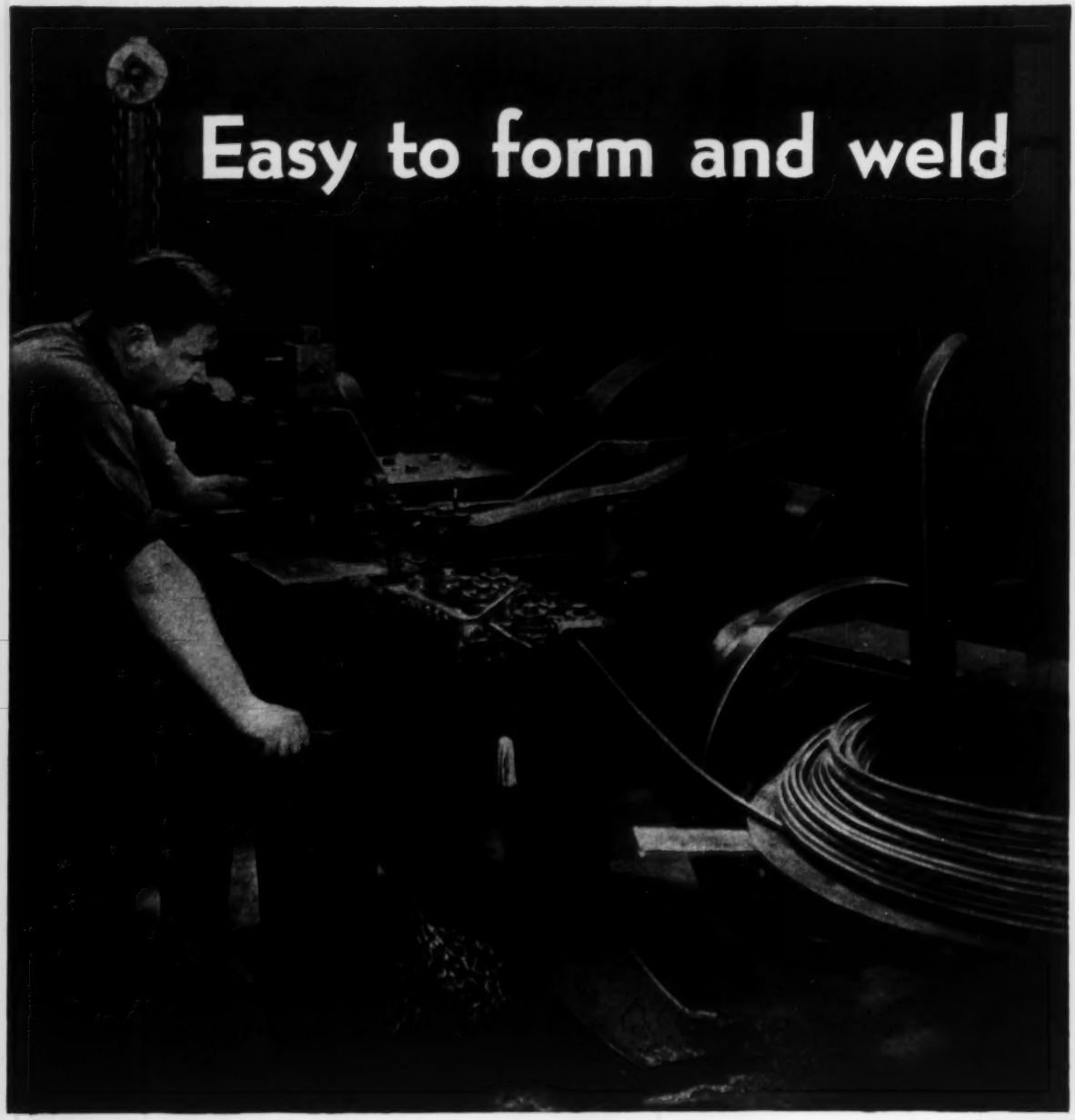
EXCLUSIVE JOINT DESIGN

SQUARE D's exclusive joint design saves installation time and reduces maintenance cost. Joint ends are identical—unnecessary to select mating ends before positioning or hanging duct sections. Outward-facing, pre-installed bolts permit rapid assembly and easy maintenance.

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS



SQUARE D COMPANY



Youngstown

QUALITY YOUNGSTOWN SERVICE

CHAIN QUALITY WIRE

● Youngstown Chain Quality Wire has the necessary qualities to form and electric weld perfect oval chain links, strong enough to take a lifetime of hard knocks. Youngstown puts these qualities into its wire in the melting furnaces and further refines them throughout the processing cycle. For further information, phone our nearest District Sales Office.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices: Youngstown, Ohio • District Sales Offices in Principal Cities

SHEETS · STRIP · PLATES · STANDARD PIPE · LINE PIPE · OIL COUNTRY TUBULAR GOODS · CONDUIT AND EMT · MECHANICAL TUBING · COLD FINISHED BARS · HOT ROLLED BARS · BAR SHAPES · WIRE · HOT ROLLED RODS · COKE TIN PLATE · ELECTROLYTIC TIN PLATE · RAILROAD TRACK SPIKES

LINDE SERVICE*

...and the Oxygen Lance

TAP A SALAMANDER TO SAVE $270,000 WORTH OF PIG IRON PRODUCTION

A tough salamander problem gets a fast, money-saving solution suggested by LINDE SERVICE engineers.

In steel mills, removing salamanders from blast furnaces formerly was a costly, time-consuming business. You had to cool the furnace before you could blast and remove the solid salamander.

The oxygen powder lance, developed by LINDE engineers, makes the removal of a salamander in a molten state possible—eliminating the long cooling period. A sluiceway is lanced through the bottom under the hearth plates and the molten metal allowed to run out.

This LINDE SERVICE method saved six days of production at 900 tons a day for one steel mill. The savings? $270,000 worth of pig iron production.

*LINDE SERVICE

is the unique combination of research, engineering, and more than 40 years of accumulated know-how that is helping LINDE customers save money and improve production in their uses of oxygen and oxy-acetylene processes.

If your company uses oxygen, LINDE SERVICE can mean dollar savings to you. Let us tell you more about it.

LINDE AIR PRODUCTS COMPANY
A Division of UNION CARBIDE AND CARBON CORPORATION
30 East 42nd Street UCC New York 17, N. Y.
Offices in Principal Cities
In Canada: Dominion Oxygen Company
Division of UNION CARBIDE CANADA LIMITED

Linde
Trade-Mark

Do you have a product that's ready for a push?

Imagine the impact your product story gets when its carried simultaneously to all your best customers and prospects!

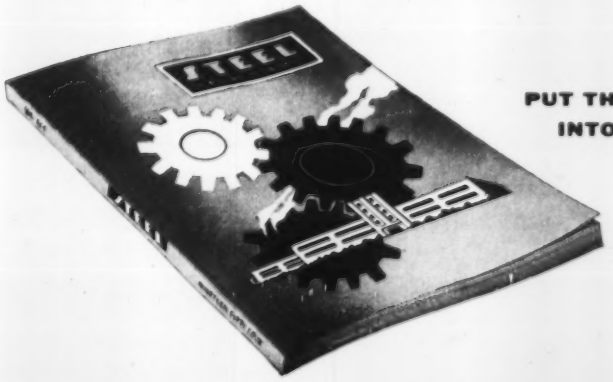
If you're dusting off a product on which restrictions have been lifted . . launching a brand new product . . . or preparing an old product for new applications . . . aggressive sales efforts can pay off handsomely in an expanding market.

That's metalworking—your biggest industrial market—*twice* as big as it was ten years ago!

But keep in mind, metalworking is people . . . people with the need, the buying influence and the purchasing power to buy your product. STEEL directs your product story to *more of this essential buying group* than any other metalworking magazine!

With the help of its Continuing Census of the industry, STEEL reaches over 138,000 of these men who manage, operate and buy for metalworking. They include your *best* customers and prospects!

Ask the man from STEEL to show you how STEEL Magazine helps you size up your metalworking sales opportunities, helps make your sales and advertising program more effective, and helps give your product story *added strength where it does the most good!* STEEL, Penton Building, Cleveland 13, Ohio.



PUT THE STRENGTH OF STEEL INTO YOUR ADVERTISING PROGRAM

OGDEN SAVES $10,000 A YEAR ON FUEL ALONE!

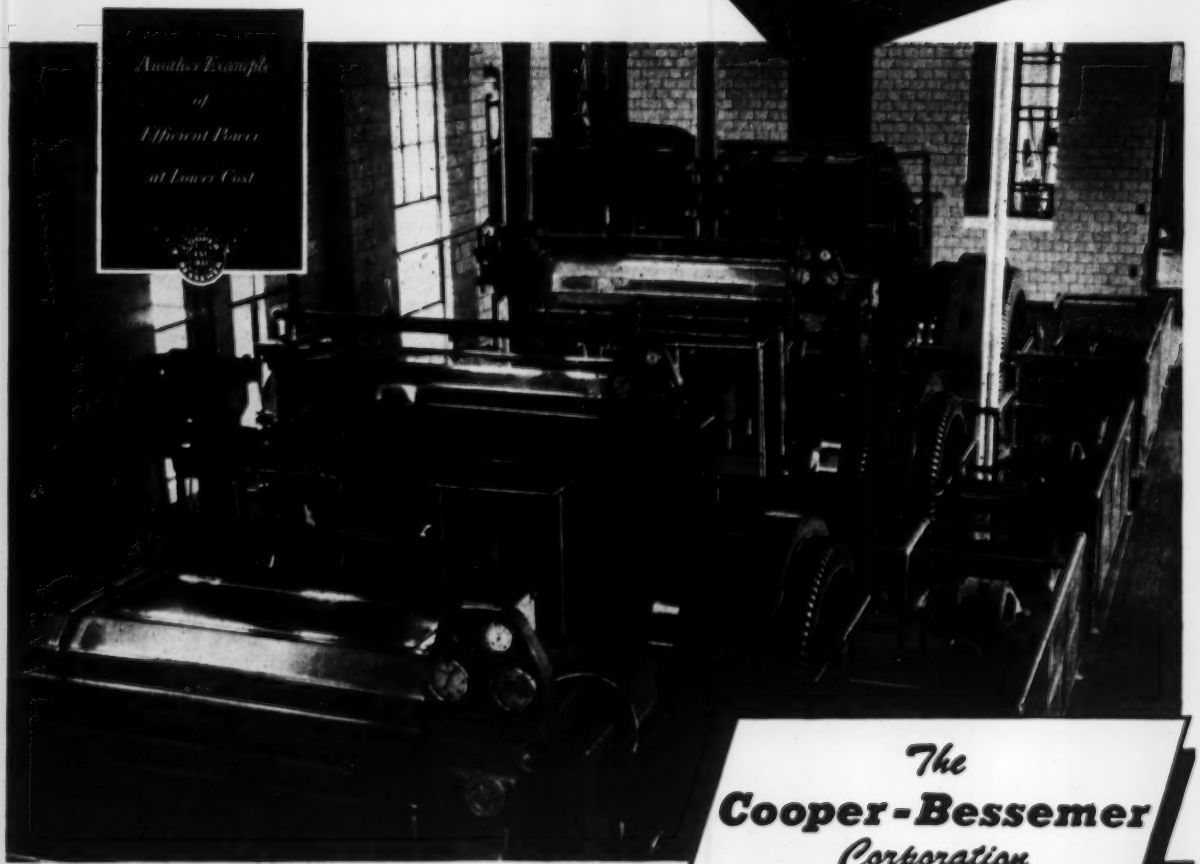
THE engines shown below are cost-cutting Cooper-Bessemer Gas-Diesels in the extremely modern, highly efficient Municipal Electric Plant at Ogden, Iowa.

Ogden's plant was completed in 1936. It was Cooper-Bessemer-powered from the start with three of these same engines, originally oil fueled. Following Cooper-Bessemer's development of the Gas-Diesel, the engines were converted and a new JS-8 Gas-Diesel added . . . in 1951.

Today, thanks to full Gas-Diesel operation and the high efficiency of these Cooper-Bessemer engines, fuel costs are actually running over $10,000 less than they would with full oil operation.

Why not check with us on the advantages you stand to gain with Cooper-Bessemer Gas-Diesels or other new-type Cooper-Bessemers on the job?

. . . with these Cooper-Bessemer Gas-Diesels



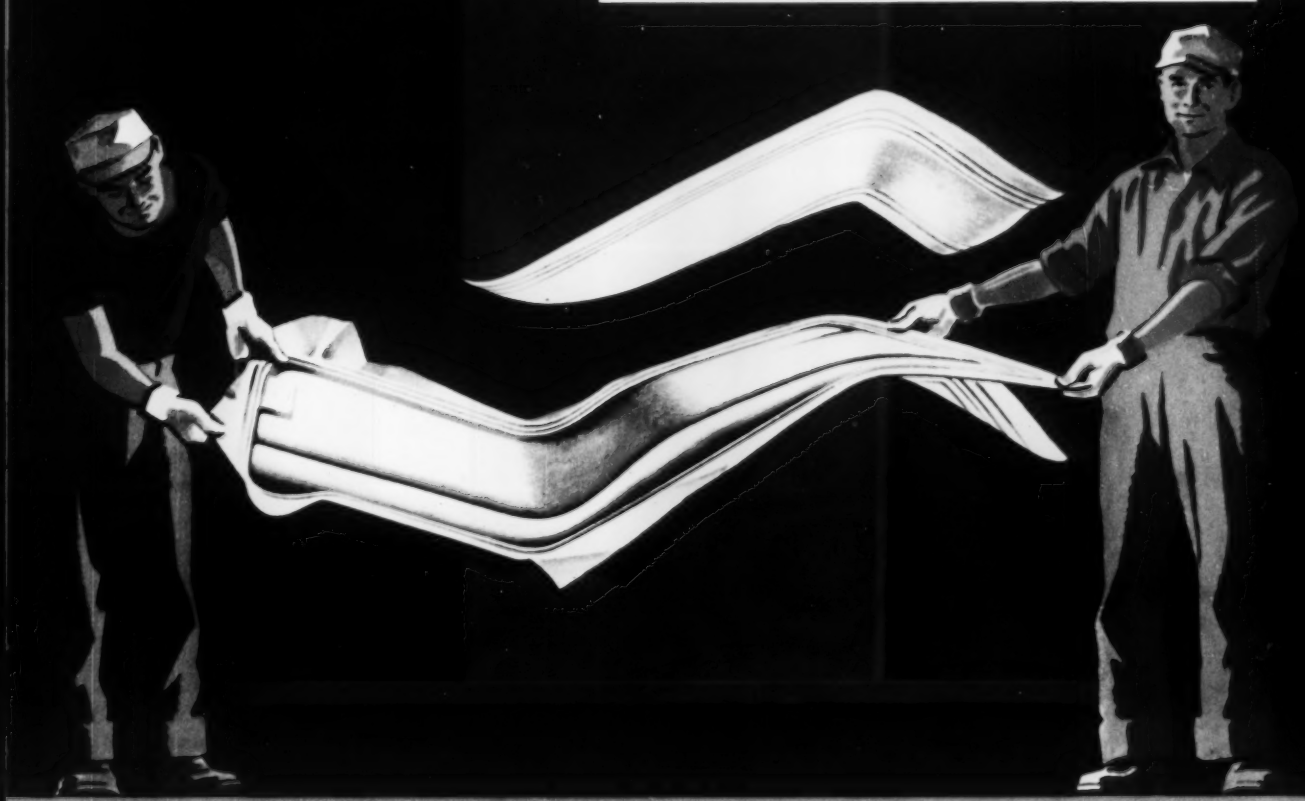
New York Washington, D. C. Bradford, Pa. San Francisco Houston, Dallas, Greggton, Pampa and Odessa, Texas ,Seattle Tulsa Shreveport St. Louis Los Angeles Chicago Caracas, Venezuela Cooper-Bessemer of Canada, Ltd., Halifax, Nova Scotia Gloucester, Mass. New Orleans, La.

The Cooper-Bessemer Corporation

MOUNT VERNON, OHIO — GROVE CITY, PENNA.

Jessop steel is designed to bring longer life to your dies

Down in the Jessop Mill, men work night and day to improve quality of melting, forging, casting and rolling procedure, so that the *Truform* and *CNS-1* cold work die steels you buy from them will be the finest you ever used. The Jessop team of metallurgists, operating men and salesmen are crusaders for high quality, carefully controlled. They know that in the long run steels that give dies the longest service life win over competition. Perfection is their goal and they're well on their way. Order Jessop and see.



STAINLESS STEELS • HIGH SPEED STEELS • NON-MAGNETIC STEELS • HIGH SPEED TOOL BITS • HEAT RESISTING STEELS • STAINLESS-CLAD PLATES • CARBON AND ALLOY STEELS • TOOL STEELS FOR SPECIAL PURPOSES • CAST-TO-SHAPE TOOL STEELS • HIGH SPEED AND ALLOY SAW STEELS • TEMPERED AND GROUND STRIP STEEL • COMPOSITE HIGH SPEED STEELS • STAINLESS AND HEAT RESISTING CASTINGS • COMPOSITE DIE STEEL SECTIONS • PRECISION GROUND FLAT STOCK • DIE STEELS—HOT AND COLD WORK

JESSOP

STEEL COMPANY • WASHINGTON, PA.

CUT COSTS ON EVERY ROLL—

YOU CAN bring down maintenance costs and step up the performance of your roll necks by using *Texaco Regal Oil* in the circulating system. *Texaco Regal Oil* assures the best possible protection against heavy loads and high temperatures. It also separates rapidly from water.

Texaco Regal Oil is turbine-quality oil especially suited to heavy duty service. It has outstanding resistance to oxidation, emulsification and sludging . . . keeps oil lines and bearings clean for uninterrupted flow of protective lubricant.

In your enclosed reduction gears, use *Texaco Meropa Lubricant*. Its high "EP" and high resistance to oxidation, thickening and foaming assure smoother operation, longer gear and bearing life.

A Texaco Lubrication Engineer will gladly help you get more efficient machinery performance throughout your mill. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Regal Oils

(HEAVY CIRCULATING OILS)

STEEL
August 9, 1954

Metalworking Outlook

The Incentives Go

Studebaker Corp. workers were scheduled to vote last week on dropping the last incentive pay plan among auto companies. Willys' Local 12, United Auto Workers-CIO, in April voted out incentives, to leave Studebaker alone. The end of incentives at Studebaker would mean a pay cut of about 14 per cent. The situation points up again the independents' troubles. To survive, they must get competitive in every way possible with the Big Three. When Studebaker-Packard Corp. is finally formed, its president, James J. Nance, indicates he wants to operate as a junior General Motors, with heavy emphasis on research, testing of customer preference and broad distribution.

Big Three Troubles

But there's trouble even for the Big Three. Unusually early and unusually long shutdowns for model changeovers indicate the declining demand for their cars, as well as for the independents' models. Chrysler Corp.'s July production was 27 per cent below June; Ford Motor Co. was off 10 per cent; and General Motors Corp. slipped 9 per cent. Model changes may last as long as eight weeks and will begin this week in some cases. In other postwar years, some of the shifts have been accomplished in as little as ten days. Thus far this year, total auto output has been running 11.6 per cent under the corresponding 1953 period.

How Communists Get In

How do Communists infiltrate into unions? One way is to switch to a rightist organization when the leftist group is beaten in a representational election. The new bargaining agent can't bar all leftists that formerly belonged to the Red-tinged union from joining its ranks. That's what has often happened when the CIO's electrical workers have beaten out the fellow-traveling UE. Both the UAW and the United Steelworkers of America take a chance on that now that they are trying to drive out the pinkish International Union of Mine, Mill & Smelter Workers in three Connecticut brass mills of American Brass Co. And the situation is complicated by the fact that UAW and USA are fighting each other as well as Mine-Mill.

Defense and Swiss Watches

The hullabaloo about raising the tariffs on Swiss watches obscures the fact that the Department of Defense had greater influence in bringing the action than trade-protectionists. Military men urged the step to protect a precision defense industry. While the move is no victory for freer-traders, it also doesn't mean that the President has gone to the high-tariff camp.

Defense Steel Needs Slide

Here's one of several reasons why steel mill operating rates are still hovering around 65 per cent of capacity: Only about 4 per cent of mill shipments are going directly to defense this year, compared to 7.6 per cent in 1953.

The Technical Outlook—p. 91 The Market Outlook—p. 131

9.1 per cent in 1952 and 7.1 per cent in 1951. American Iron & Steel Institute figures that mills shipped 6.1 million tons directly to defense programs, including atomic energy, last year, compared to 6.3 million tons in 1952 and 5.6 million tons in 1951. The figures exclude warehouse shipments destined for defense and deliveries to contractors who would incorporate the metal in defense end-items.

Fourth-Quarter Prospect

Producers of military "A" items—special products with no civilian counterpart—will get purchase authority for 651,270 tons of steel in the fourth quarter, 12 per cent less than in the third. They'll get 72,006,604 pounds of copper and copper-brass alloys, 15 per cent less. They will get 106,728,834 pounds of aluminum, 7 per cent less. Slower aircraft and tank-automotive procurement account for the declines.

Missiles: Soaring Market

Defense department has spent between $4 billion and $5 billion in its guided missile program since World War II, says Aircraft Industries Association. About $300 million is the current annual rate of investment by the U. S. in the program. A number of pilotless aircraft already are in quantity production.

More About Mergers

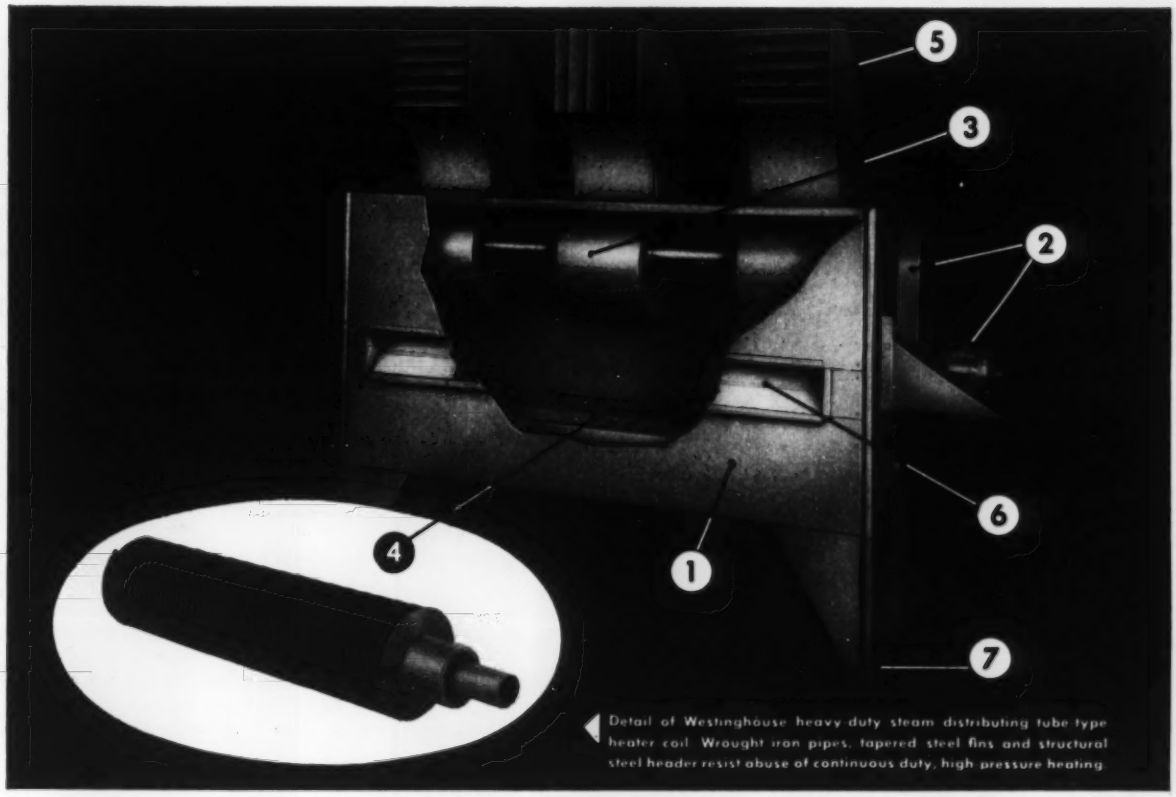
Final approval of a merger between Bethlehem Steel Corp. and Youngstown Sheet & Tube Co. is still some time off, but odds are better than even that the deal will be consummated. In addition to giving Bethlehem facilities in the Midwest, the merger would bring it seamless pipe, cold-finished bar and stainless steel capacities which it doesn't now have.

Straws in the Wind

U. S. Army Ordnance has placed contracts totaling $40.7 million for production of Centurion Mark V tanks and ammunition in Britain. . .Westinghouse Electric Corp. has developed a lightweight 17-inch picture tube that it claims brings portable television a step closer. . .Philco Corp. is developing its own color system for color television. . .The geographical center of the nation's steel industry is six miles south of Beaverdam, O., where there isn't a steel plant in sight. . .General American Transportation Corp. will make material handling equipment as a further step in diversification.

This Week in Metalworking

With their eye on the elections this fall, Republicans are moving to "nudge" the economy forward (p. 53). . .Tacklemakers are reeling in $150 million a year as more Americans than ever plague the poor fish (p. 54). . .Merritt-Chapman & Scott Corp. continues its diversification and integration program (p. 55). . .The civilian atom: A round-up on its future and present (p. 56). . .Quebec-Labrador ore shipments to the U. S. begin (p. 58). . .Why is industry moving to Louisville? (p. 63).



Detail of Westinghouse heavy-duty steam distributing tube-type heater coil. Wrought iron pipes, tapered steel fins and structural steel header resist abuse of continuous duty, high-pressure heating.

Rugged, Quiet Westinghouse Industrial Heaters... Designed For Continuous Heavy-Duty Systems!

Seven Features Assure Dependable, Versatile Coverage of Large Areas

Westinghouse Industrial Heaters supply ideal heat under difficult conditions. In plant, warehouse, garage and similar buildings, these heaters efficiently blanket large work zones, even those with high ceilings, frequently opened doors and expansive window areas. They also supply make-up air for exhaust systems . . . may be used to circulate ventilating air during warm seasons. Capacities in six sizes range up to 2,500,000 BTU/hr . . . 25,000 cfm . . . 200 psig steam pressure.

Each Westinghouse Industrial Heater is a complete unit. That's why each can be placed where it will do the most good . . . whether on floor, or wall (upright or inverted), or suspended from ceiling. Economically selected and scientifically grouped, Westinghouse Industrial Heaters satisfy the needs of areas of any size or shape, and can be readily relocated to suit plant layout changes.

Westinghouse Industrial Heaters have a line-up of features that is unique:

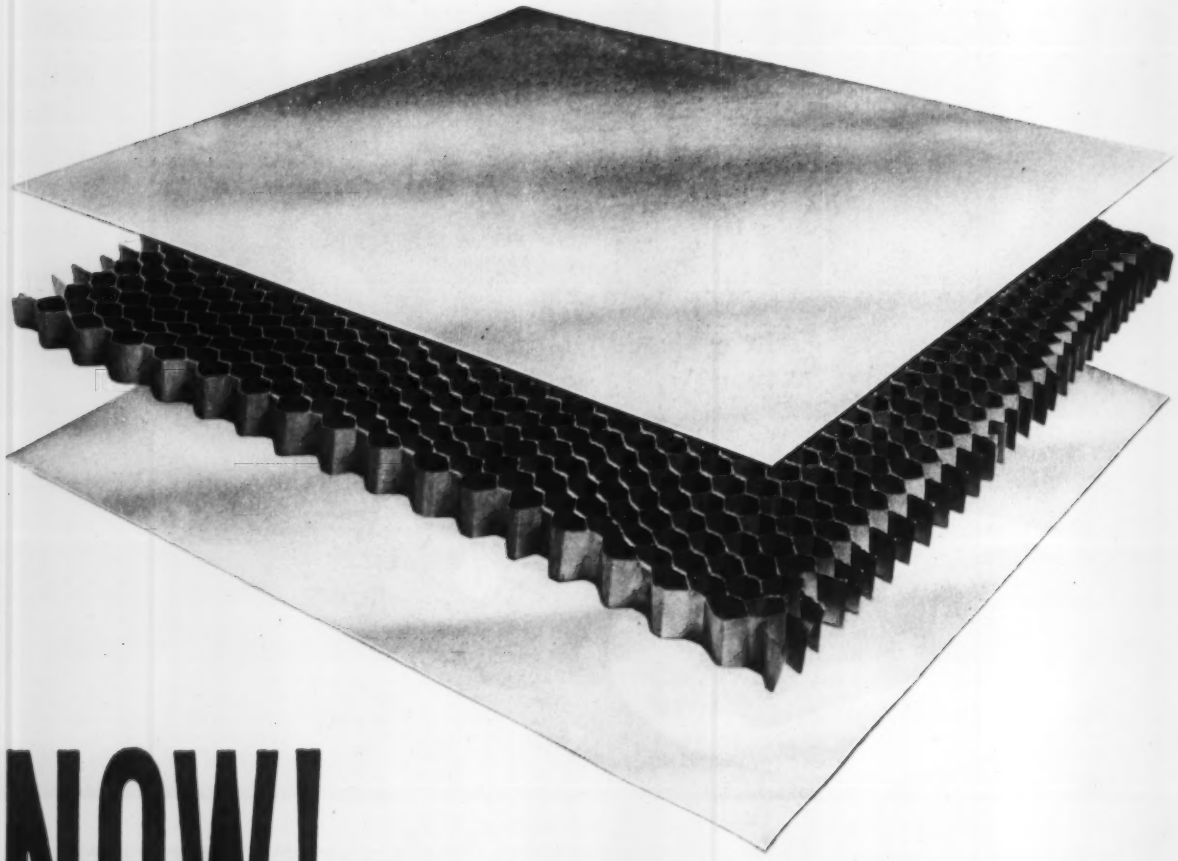
1. Casings are rugged heavy-gauge steel. Front and back panels are easily removed.
2. Standard motors have adjustable V-belt drive on units with motors up to 5 HP.
3. Powerful, yet quiet, fans are multiblade centrifugal type mounted on a common shaft. Blades are forwardly curved.
4. Efficient steam coils are heavy-duty or general purpose. Former are wrought iron for extra-long life (see detail shown above); latter are standard or steam distributing copper-tube type.
5. Discharge outlets and deflectors permit flexible discharge arrangements. Result: most advantageous airflow and heat distribution pattern.
6. Bypass damper arrangement permits constant air modulation. Standard arrangement permits steam modulation.
7. Rounded corners, smooth surfaces eliminate accidents, minimize dirt.

These features are backed up with a Westinghouse-Sturtevant exclusive—a single equipment warranty with undivided responsibility. This unit responsibility is your greatest guarantee of dependable performance for years to come. For complete details call on the Westinghouse-Sturtevant air handling specialist conveniently located in your area. Or write: Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Boston 36, Mass.

WESTINGHOUSE AIR HANDLING

YOU CAN BE SURE...IF IT'S Westinghouse

J-80413



NOW! Cellular Sandwiches of Stainless Steel for Aircraft

This cellular mat of Armco 17-7 PH Stainless strip is the filler that is sandwiched between two stainless steel sheets to make an aircraft panel.

How It Works

The 2 to 3-thousandths of an inch thick core material, when bonded into panels with adhesives or by brazing, permits the skins or faces of the panels to be stressed to their yield strength without premature buckling. The core carries the shear and compressive loading.

Why It's Strong

Panels have very high strength-to-weight ratio due to their design, and because both filler strip and cover sheets are made of Armco 17-7 PH. This precipitation-hardening stainless steel develops typical tensile yield strengths of 180,000 psi, and even higher *compressive yield strengths*, through double low-temperature heat treatment.

Where Used

The cellular 17-7 PH stainless panel is under development for jets, rockets and missiles because of its great strength at temperatures up to 900 F. Yet it can be used in cold or hot service for tail pipe shrouding, leading edge sections, bulkheads, fins, control surfaces, after-burner cases, and many other applications requiring corrosion resistance, lightness and enduring strength.

Ask About This Stainless

Just write us at the address below and we will send you complete information on the precipitation-hardening stainless steels, Armco 17-7 PH and Armco 17-4 PH.

ARMCO STEEL CORPORATION

4684 CURTIS STREET, MIDDLETOWN, OHIO

ARMCO®

SHEFFIELD STEEL • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

Changed Men's Minds

On Saturday, July 31, at Seven Islands, Que., the first iron ore from the Ungava fields of Quebec and Labrador was loaded into the 20,000-ton freighter *Hawaiian* for shipment to the United States. Last Thursday the vessel's arrival at the Pennsylvania Railroad's new pier on the Delaware river near Philadelphia was heralded by appropriate dedication ceremonies. A few days later Ungava ore transported in smaller vessels was to arrive at Lake Erie ports.

These initial shipments from an important new source of iron ore have a special significance. They lend emphasis to the fact that our nation henceforth must depend more than ever before upon materials imported from other countries. They serve to remind us that in connection with a single important raw material—iron ore—we already are receiving supplies from Venezuela, Liberia, Cuba, Canada and other countries.

Already this new pattern of iron ore supply has been responsible for a revolutionary change in the attitude of many people on an issue that has confronted the nation for several decades. When the development of the St. Lawrence waterway was first proposed many years ago, American railroads, Great Lakes shippers, many iron and steel interests and Atlantic seaports were definitely opposed to it. When the demand of two world wars depleted Mesabi reserves more rapidly than had been expected and when the need for obtaining ore from more distant sources became apparent, many who had opposed the St. Lawrence waterway suddenly came out strongly for it.

Parenthetically, it is interesting to note that of the American railroads which opposed the waterway, the largest—the Pennsylvania—is the first to benefit from the Ungava project, which played such an important part in tipping the scales in favor of authorization by Congress of American participation in the waterway.

Just as this Quebec-Labrador iron ore development has helped to change men's minds about an important undertaking, just so will similar projects in the near future alter our attitudes toward world trade in general. Advances in communication are bringing the countries of the world closer together faster than we realize. A freer exchange of goods between nations is inevitable.

E. C. Shaner

EDITOR-IN-CHIEF

KENTUCKY BOOMTOWN: Older readers of this page will remember Louisville fondly as a city of gracious hospitality. Most of its people were quite complacent over the assurance that its agricultural, tobacco, whiskey and horse breeding and racing economy would provide a fairly comfortable mode of living. That was in the late nineties and in the first several decades of the present century.

Today Louisville is in the feverish grip (p.

63) of a new vitality and aggressiveness. After many years of unimpressive growth industrially, it has suddenly come to life. Within the last few years, discriminating corporation executives have begun to recognize Louisville's advantages. It is a major gateway to the South. It has ample power. Its labor pool is reliable and amenable. Its transportation facilities are excellent. It is close to the center of population and to many important markets.

The cab driver who said General Electric's new appliance center was the best thing that had happened to Louisville since the Kentucky Derby was not too far off the beam.

* * *

HARDER'S AUTOMATION: Ford Motor Co.—whose Del G. Harder, vice president, manufacturing, not only coined the word "automation" but has played an important role in developing it as an important factor in industry—is building an assembly plant at Milpitas, Calif., (p. 67) in which the Ford ideas of automated mass production may be carried far beyond anything witnessed in the past.

As of today one of the show places where Ford automation is demonstrated dramatically is the engine plant in Cleveland. Here the manner in which machines have been hooked together and operations co-ordinated is uncanny. At Milpitas, where Ford will be working with the assembly of frames, bodies and accessories, instead of the casting and machining of engine blocks, the opportunity for automation may be even greater.

Apparently electronically controlled synchronization will play a more important role in Milpitas than it has in Cleveland.

* * *

BETATRON IS AMAZING: Assume that a salesman tried to convince you that if you invested $350,000 in certain laboratory equipment you would save enough in less than a year to pay off the investment. Naturally you would be skeptical, but if you became convinced that the salesman was telling the truth, you would admit that he was offering you a rare bargain.

In September, 1952, Allis-Chalmers Mfg. Co. placed in operation at its West Allis, Wis., plant a $350,000 industrial radiography laboratory with a 22-million volt betatron. Less than one year later (p. 102), a report to management stated that the entire cost had been amortized by savings resulting directly from its use.

Also, the equipment insured superior quality control of critical components for high pressure, high temperature and heavy-duty equipment. It increased the utility of other nondestructive testing methods through co-ordinated use with the betatron. It enabled early location of defects in castings and forgings. In addition to these and other benefits, the operation of the betatron itself has been economical.

* * *

WELCOME STANDARDS: Users of aluminum will welcome the new system of uniform alloy designations for wrought aluminum and aluminum alloys (p. 94) which will become effective Oct. 1. Developed by the Aluminum Association, it will enable buyers to use the same alloy number in ordering material from any supplier.

The system employs a four digit number. The first digit indicates the general group to which an alloy belongs. The second digit signifies any modifications of this alloy or changes in impurity limits. The third and fourth digits are used to identify the alloy. In most cases old numbers are retained in the last two digits of the new specification numbers. For instance, Alloy 61S will become 6061.

This movement toward standardization and simplification should go a long way in clearing up confusion resulting from the present differences in designations.

* * *

SEE PICKUP AHEAD: August is one of the favorite months for vacations, which is one of several reasons why the third quarter may witness sales and profits in the metalworking industry at their lowest point. Right now major business barometers (p. 71) which are higher than they were at this time last year are electric power distributed and construction volume.

Both of these are well ahead of last year. However, steel ingot output, coal production, automobile and truck assemblies and freight car loadings lag behind last year's figures. Almost everybody sees signs of a pickup in business in the fourth quarter. This promise of improvement, coupled with the fact that the second quarter was surprisingly good, may make 1954 not too bad a year for many companies.

Help wanted!

We need your advice
on applications for the new

DRAVO HYDRAULIC BUFFERS

The new Dravo Hydraulic Buffers can be used for hundreds of applications in industry. In *your* plant alone there may be two—or three—or half a dozen places where a Dravo Hydraulic Buffer installation can add safety, protect personnel, save maintenance and eliminate the cost of accidents, and resulting downtime for repairs.

We just don't know of all the places where hydraulic buffers could be applied. That's why we're asking you for your help in spotting possible applications.

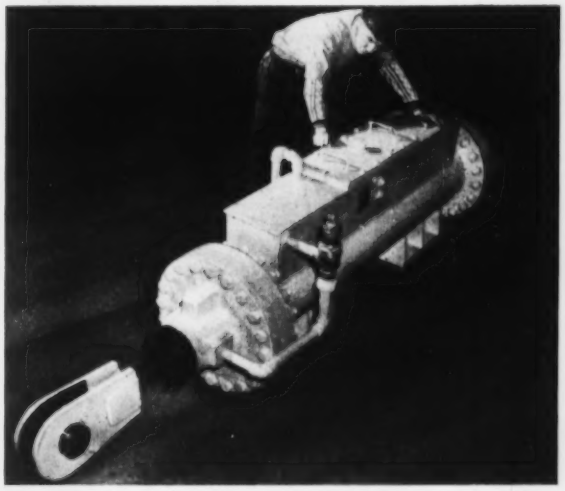
We *do* know that Dravo Hydraulic Buffers are the answer to decelerating and stopping runaway man trolleys on ore bridges when mechanical and electrical braking have failed or bad weather has made braking ineffective on slippery rails. Here the Dravo Hydraulic Buffers act as an auxiliary brake, stopping the man trolleys smoothly and safely. Without the buffers, costly and fatal accidents could occur.

It's up to you now!

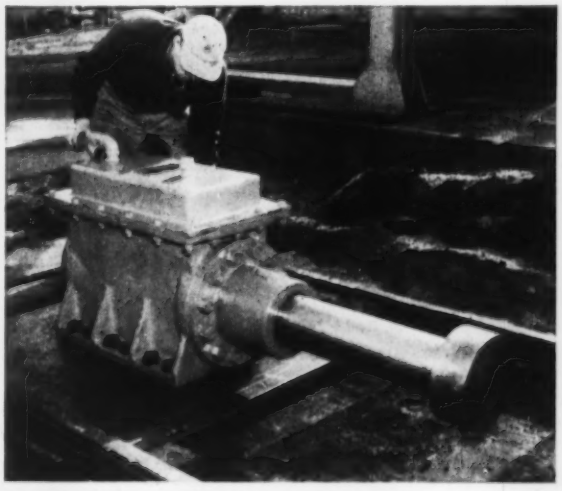
We've engineered these buffers to meet some tough requirements. We've tested them and *know* what they can do and how well they can do it. Several steel plants are already using these buffers successfully.

How about you? Where can you use Dravo Hydraulic Buffers? Let us send you complete information. Then you give us some ideas on possible applications, so we can pass them along to other industrialists who have similar problems. Mail the coupon.

DRAVO
CORPORATION
Neville Island, Pittsburgh 25, Penna.



SIX-FOOT HYDRAULIC BUFFER. This pull-type hydraulic buffer is equipped with a latching device to reset the buffer automatically when its work stroke is completed. Maintenance is low because of the buffer's simple construction. Latching mechanism parts are mounted in self-lubricating bushings. Only periodic inspection is needed to check hydraulic fluid levels.



TWO-FOOT HYDRAULIC BUFFER. This push-type buffer acts on direct contact with equipment. A spring action returns the buffer to normal position. The simple design of the buffer assures a minimum of routine maintenance.

Dravo Corporation
Neville Island, Pittsburgh 25, Penna.

DRAVO

☐ Please send me complete information on Dravo Hydraulic Buffers.

☐ Please have a representative call.

Name _____

Title _____

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City _____ Zone _____ State _____

a scrap futures market...

will it help or hurt you?

If you are a steel user with scrap to dispose of, you might wonder if you'll be affected as the trading in scrap futures starts on the Chicago Mercantile Exchange. The Exchange believes that "hedging"—(the trading of cash and future sales simultaneously to reduce loss in a down market) will justify trading of scrap as a listed commodity. Some degree of price stabilization may also result. But to every steel user, scrap represents a loss. *Whatever* the price of salvage, it will only be a small percentage of the price of good steel.

Futures market or no, scrap is something you can profitably do without—and there is still one best method to avoid scrap losses. That is to order just the steel you need from Ryerson—cut to size and ready to use. Avoid carrying large stocks that tie up capital and may become obsolete and finally have to be scrapped. Let Ryerson worry about the scrap and shorts. We are set up to dispose of them efficiently as a regular operation of our business. Thus you can avoid unprofitable scrap handling and selling . . . free your men, machines and dollars for other work.

Your nearby Ryerson plant is completely equipped with modern sawing, shearing and flame-cutting machines so that every kind of steel can be quickly and accurately cut to any size and shape. So keep scrap out of your future. Call Ryerson for quick delivery of steel tailored to your exact requirements.

Principal products: Bars, structurals, plates, sheets, tubing, alloys, stainless, reinforcing, machinery & tools, etc.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAND DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

HOUSING SPUR

(More liberal FHA mortgages; continuing federal housing)

Washington nudges the economy forward with . . .

TAX RELIEF

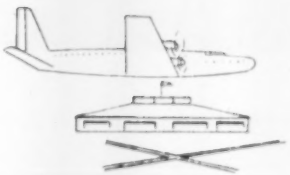
(Liberalized depreciation; better break on dividends)

AID TO SHIPBUILDING

($385-million U. S.-private program)

MORE ROAD CONSTRUCTION

($1.5-billion federal aid in 1954; $50-billion program ahead)



HELP ON AIRPORTS

($22.5-million U. S. expenditure)

Third-quarter business may drop to the year's low point. But the fall upturn, plus the government's nudges, could make 1954 business second best in history

LOOK FOR 1954 to wind up second best businesswise in the nation's history.

Current activity indicates the nation's business may hit its low point this year in the third quarter, but government programs, along with the fall seasonal influence, will nudge the economy upward.

And Votes Too — By election time—and few will deny that the Republican program isn't looking for votes too—the effects of these governmental influences should begin to be felt: New tax program, revised National Housing Act, the shipbuilding program, aid for road construction and airport construction.

Already building toward an all-time high, construction is one of the strongest factors of the economy. Actual expenditures for construction during the first half hit $17 billion, slightly above 1953. The government is making mortgage money more liberal and the revised housing act will authorize a maximum of 35,000 low-rent public housing starts between now and next June 30. Add that to the current phenomenal demand for new schools, hospitals and other public construction and the outlook for this industry is tops.

Building Confidence — Benefits of the revised tax bill should not only be material but psychological as well on the nation's business and industry. Liberalized depreciation plus relief on double taxation of dividends should do much to stimulate new investment capital as well as have a direct money savings. Under the new tax setup, losses can be charged against two years of earnings in the past as well as five years in the future.

Probably the biggest impact for a single industry in the government's program will be to shipbuilding, hardest hit of all metalworkers in the current readjustment. Already contracts for a new Forrestal-class supercarrier and two new atomic-powered submarines have been awarded. Negotiations for more ships in a $385-million government-private program are under way. Officials have stated that government awards will be made on a competitive basis but in a manner as to insure that no single shipyard or no single geographical area receives more than its share.

On the Road — Metalworkers supplying the road construction industry can look forward to an order increase as the government's road and airport construction programs are carried forward. Current active highway program includes work totaling $2.5 billion, of which $1.5 billion is federal money. President Eisenhower's "grand plan" of federal aid to states in a $50-billion program will also be pushed by the administration. In the appropriations bill, $22.5 million is earmarked for airport construction.

By most economy yardsticks,

the nation's business is healthy. Profits for the first half of 1954 (see STEEL, Aug. 2, p. 50-51) were better than most expected. At the end of June the annual rate of national income was $299.5 billion, $7.5 billion above 1952 and only $6.5 billion under 1953. Disposable personal income for this year is higher than for either 1952 or 1953.

GNP—Still High—Secretary of Commerce Sinclair Weeks points out that gross national product so far in 1954 is only 2.8 per cent below 1953. The annual rate at the end of June was $356 billion compared to $348 billion in 1952 and $367 billion in 1953.

Corporation Profits Steady

Profits after taxes of $2.6 billion for U. S. manufacturing corporations in the first quarter of 1954 were at the same level as in the preceding quarter but 9 per cent lower than the $3 billion net profit after taxes in the first quarter of 1953.

This was shown in the quarterly financial report issued jointly by the Securities & Exchange Commission and the Federal Trade Commission. Profits before taxes of $5.1 billion in the first quarter were 19 per cent above the preceding quarter, but were still 23 per cent below the same period in 1953.

Manufacturers' sales in the first quarter of 1954 were estimated at $60.9 billion, a decline of 6 per cent from the last quarter in 1953.

GE Tooling for Transistors

General Electric Co. is tooling for mass production of low cost, high frequency transistors. Now small quantities of finished transistors are being fabricated on a pilot line in Syracuse, N. Y., for engineering and military evaluation and eventual sampling to design groups.

Large quantity production of the transistors has been made possible through a method of mass producing essential transistor elements. Dr. W. R. G. Baker, GE vice president and general manager of the company's Electronics Division, said mass production will get under way in the next two years.

Evinrude Motors

There's business in pleasure as . . .

Tacklemakers Reel In $150 Million a Year

PITY the poor fish! He doesn't know it, but he's fighting a $150-million-a-year industry and close to 20 million licensed fishermen. Add hordes of small boys with cane poles and bent-pin hooks and what chance has a poor fish got?

Recreational fishing is big business and is getting bigger. The number of licenses sold about doubled in the five years immediately following World War II, and the upswing isn't over yet. One company expects business to be up about 16 per cent this year.

Specialists — Upwards of 150 companies are in the tacklemaking business, not counting small stores making equipment for local markets. But only a few companies make a complete line of rods, reels and accessories.

Along with the industry's growth have come changes in tackle. Time was when steel and bamboo reigned supreme. But now there is a new king, Fibreglas. Before the war about 3 million steel rods were made annually; now the total is only about 50,000. Glass rods are not only cheaper but better, says J. M. Brennan of Horrocks-Ibbotson Co., Utica, N. Y.

Tenfold Increase — Other advantages are that Fibreglas rods require no expensive finishing operations such as heat treating, straightening and soldering. Consequently, they can be made in a small plant. This is one reason for the jump in companies making rods. B. F. (before Fibreglas) the number was about ten. Now there are about 100.

But though one-piece steel rods are losing out, steel telescopic rods are still popular. Sealand Inc., Torrington, Conn., one of three companies still making that kind of rod, reports it's one of the company's most consistently popular and largest-volume items.

Nylon Gears — Another place where metals have given way is in gears where nylon has taken over from bronze. But don't get the idea that metal has lost out all together. Sheakespeare Co., Kalamazoo, Mich., reports its best reels are made almost wholly of stainless steel. And raw materials ranging from dead soft steels to hardened alloys, naval bronze, stainless wire, lead, nickel and Carboloy are among those listed by James Heddon's Sons, Dowagiac, Mich., manufacturer.

Horrocks-Ibbotson alone uses annually 40 tons of copper alloys and about 60 tons of aluminum.

Machine Tools — In the line of machine tools, tacklemakers use

turret lathes, automatic screw machines, kick and hydraulic presses, shapers and grinders. Which means metalworking still hooks a sizable hunk of change.

Some other changes in raw materials are increased use of aluminum and aluminum die castings at the expense of brass, bronze and wrought aluminum. Chrome-plated aluminum is coming in for more use, as are superhard chrome alloys used for guides.

Outlook: Lots of trouble for the fish.

Piggyback Case Postponed

Investigation and suspension proceedings by the Interstate Commerce Commission on piggyback rail service in the Official Territory have been adjourned until Oct. 12, 1954. Adjournment to allow time for cost studies was requested by the protesting motor carrier representatives and Brooklyn terminal companies.

An agreement was reached before adjournment under which rail respondents will provide the motor carriers with cost data and information on volume of piggyback traffic by Aug. 20.

Merritt-Chapman Takes Another Step

Marion Power Shovel Co. gets latest bid in Merritt-Chapman diversification program. Company operations now include construction, steelmaking and fabricating

METALWORKING INTEREST in merger patterns stepped up last week as Merritt-Chapman & Scott Corp. offered to acquire up to 80-per-cent interest in Marion Power Shovel Co.

For Merritt-Chapman it was the fourth major step in its diversification program since late 1953. Previous acquisitions: Milton Electric Steel Corp., Milton, Pa.; Fitz-Simons & Connell Dredge & Dock Co., Chicago; Newport Steel Corp., Newport, Ky.

Another Step—Louis E. Wolfson, president and board chairman of Merritt-Chapman, says the proposed acquisition of Marion Power Shovel is another step in Merritt-Chapman's planned program for still further diversification of operations. Marion Power Shovel produces a variety of excavating equipment and cranes used in mining and construction industries.

Integration, with Merritt-Chapman forming the core, appears to be the major factor in the diversification program. The steel companies provide a market for Merritt-Chapman's scrap from salvage operations; steel products are used in M-C's wide range of activities which include marine and heavy chemical, industrial and building construction work.

The Others—In the network, too, although not directly connected to Merritt-Chapman is the New York Shipbuilding Corp. of which Mr. Wolfson is also board chairman. Diversification programs in the shipbuilding company included the acquisition of Nesco Inc., Milwaukee, this spring and the Somerville Iron Works Inc., Chattanooga, Tenn. Steel from Newport is fabricated by New York Shipbuilding for Merritt-Chapman's big construction projects. Nesco produces a line of kitchen and household utensils and heavy industrial steel drums.

With the Newport Steel transaction came a wholly owned subsidiary, Utah Radio Products Co. Inc. This Indiana company produces radio and TV cabinets and a wide range of electrical and electronic assemblies for leading manufacturers. Mr. Wolfson says his company is "naturally interested in expanding to a great extent as possible the present volume of Utah," but there are no present plans to enter the radio and TV field as a brand name producer.

Expansions — A $6-million expansion and modernization program at Newport Steel is nearing completion. Improvements now complete include pipe mill extension, new pipe and gutter machines and culvert coating equipment.

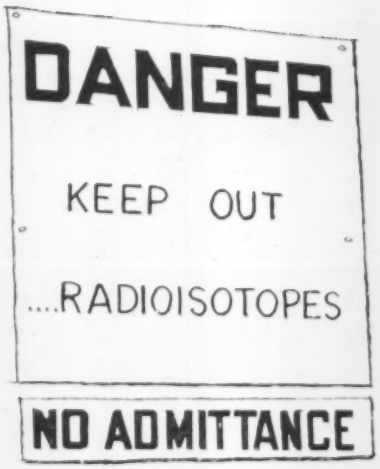
Acquisition plans of Marion Power Shovel also include expansion plans, Merritt - Chapman states.

Advancing Conveyor Keeps up with Continuous Miner

An extensible belt conveyor developed by Joy Mfg. Co. of Pittsburgh moves coal as rapidly as continuous mining machines can rip it from the seam. Resembling a giant caterpillar, the mechanism pays out belt as needed so that one end of the system can follow the mining machine into the seam of coal. By adding extra belt lengths, the conveyor can advance as much as 1000 feet into a coal mining room. The machine can carry up to 440 tons per hour at top speed

CIVILIAN ATOM:

Future and Present



Development of competitive nuclear power will take time and money. Meanwhile, industry makes good but limited use of atomic energy

CLOSE TO $1 BILLION will have to be spent on prototype plants and pilot models by 1964 before nuclear power can become competitive with conventionally generated power. So says Alfonso Tammaro, assistant general manager for research and industrial development, Atomic Energy Commission.

In addition, metalworking will gain other new markets because several hundred million dollars will have to be invested over the next five years in research and development.

Industrial Atoms — But for the present the atom is finding its place in ever-increasing phases of American industry. Mr. Tammaro says there are now 3400 different institutions and about 15,000 persons using radioactive materials. About 860 industrial firms are finding uses for the atom in 1100 plants. "The expansion of the industrial use of radioisotopes has been ninefold in the past four years," he declares.

Proved industrial uses of radioactive materials are still few, but the list is growing. Efforts to cut costs in industrial processes and improve quality have undoubtedly spurred the development.

Accent on Quality—Most of the uses are, in fact, for quality control. One of the most common is radiographic inspection of castings, weldments and the like. Usually Iridium-192 or Cobalt-60, which costs about $50 a gram, is substituted for radium, which costs about $25,000. With this method, the source of radiation is taken to the workpiece to be inspected rather than stopping the flow of work to take the piece to the source, as in the x-ray process. About 350 American companies use radiographic inspection.

One result of the method is a revision of boiler codes to permit thinner steel shells than were formerly required. The savings of steel on a 50-foot spherical pressure vessel would amount to about $9000. Cost of radiographing the sphere would be about $3000, resulting in a net saving of about $6000. Added benefit is a safer piece of equipment, Mr. Tammaro explains.

Multipurpose Gage—Another use of radioisotopes is to measure, record and control thickness or density of materials such as strip metals, rubber, paper and textiles. Carborundum Co., Buffalo, purchased five radioisotope gages at $5000 each for quality control in the manufacture of abrasive paper. Savings: $100,000 in the first year, mostly through reduction of reject rate. Because these are continuous gages, additional savings as high as 10 to 20 per cent can be attained by elimination of starting and stopping times. Over 300 companies are now using the gages.

Cincinnati Milling Machine Co., Cincinnati, uses radioisotopes to measure and control friction and wear of cutting tools. Tool tips are made radioactive so that the minute quantity of the tip which wears off during machining can be measured on the chips by a geiger counter. By small adjustments to the machine, the amount of wear

can be reduced and the life of the tool prolonged. The new method takes 30 to 45 seconds and does not require stopping the cutting operation or dismantling the machine.

Real Bargain — California Research & Development Corp., Richmond, Calif., used the same principle to develop a better motor oil. It radioactivated the piston rings of an engine and, continuously studying the radioactivity of the oil, determined the amount of wear of the rings. The company estimated that the old method of disassembling the engine after each test run would have required 60 man-years of effort and $1 million. With the help of the atom, it was done in 4 man-years for a total research budget of only $35,000.

The plating and jewelry industries also use radioactive elements. Armco Steel Corp., Middletown, O., has installed gages on its continuous strip coating lines to measure the thickness of the zinc coating.

That's Not All—Other important uses include the detection of leaks in industrial equipment and measuring liquid levels in enclosed containers or where such measurement would be otherwise difficult or impossible.

Mr. Tammaro points out: "Facilities for radiographic inspection involve an outlay of less than $500. A completely equipped laboratory for radioisotope investigations in process control and in research can be set up for $1500 to $3000, depending upon the quantities used."

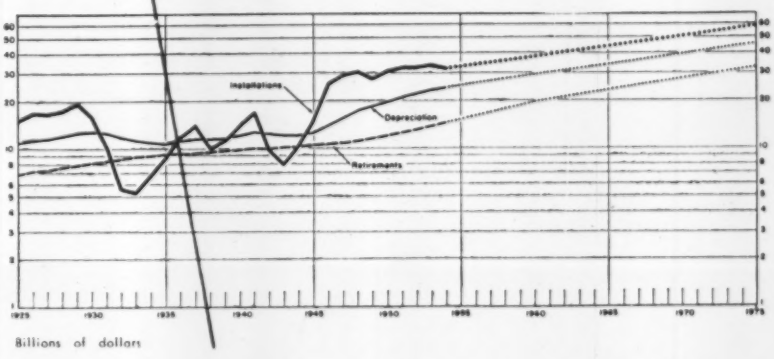
Atomic Power Available Soon?

Continued progress is being made in the development of reactors for industrial nuclear power which may be produced economically in the foreseeable future, the Atomic Energy Commission told Congress in its 16th semiannual report.

Plans are in the offing for the construction of a second and more powerful "breeder" reactor for producing atomic fuel and at the same time turning out heat capable of use in power generation. One such experimental reactor is in operation.

U. S. production of uranium ore and uranium concentrates reached record levels in the last six months.

Trends Behind Capital Outlays Show . . .



* Installations, depreciation and retirement of business plant and equipment at 1953 prices. Source: Machinery & Allied Products Institute

Why Plant, Equipment Spending Will Rise

CURRENT LEVEL of capital expenditures will be sustained and expanded in a normal growth trend.

That's the conclusion of Machinery & Allied Products Institute in its latest capital goods review. In it, MAPI has analyzed the relation of annual plant and equipment depreciation and retirement to installation.

Still High—According to Securities & Exchange Commission figures (see STEEL, June 14, p. 59), business and industry are now making capital expenditures at the rate of $27.2 billion annually, only 4 per cent under last year's record $28.4 billion. SEC figures do not include agricultural expenditures. MAPI's figures in the chart above include agricultural expenditures along with industrial, public utility, transportation, commercial and miscellaneous.

This is the way MAPI pictures the long-term trend ratios of depreciation and retirement to installations, based on the industry and business historical growth trend of 3 per cent per annum compounded:

Steady Rate—Plant and equipment depreciation will average about 75 per cent of installations. It will rise from the present $24 billion to $30 billion in 1960 and $45 billion in 1970. Thus, installations will total approximately $61 billion by 1970.

Retirements will vary—plant retirement will decline progressively at a moderate rate, and equipment retirement will rise sharply from 40 per cent currently to 60 per cent by 1975. The rising ratio of equipment retirements obviously appears more favorable for expansion in demand than that for plant.

Just Normal—MAPI also concludes in its studies that total investment in plant and equipment since the war has not been excessive, despite the backlog of demand created by the war.

Westinghouse Sales Climb

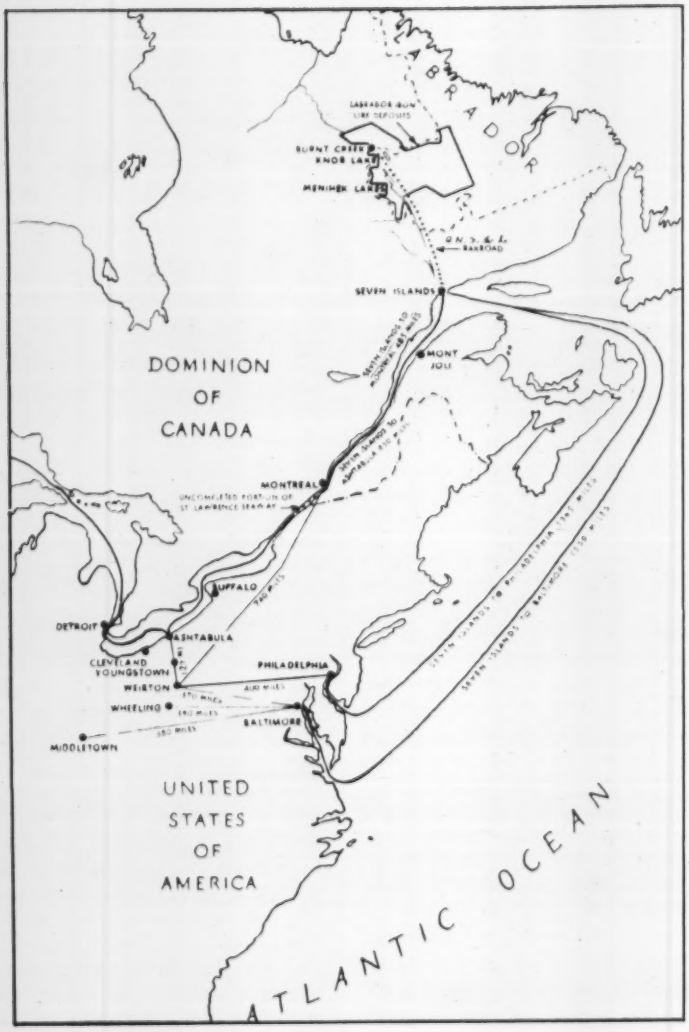
Net sales of $811,709,000 for the first half of 1954 set an all-time high for Westinghouse Electric Corp. and increased net income 27 per cent over the first six months of 1953. Sales, highest for any six months in the company's history, were 4 per cent higher than the first-half sales of $780,489,000 in 1953.

First-half net income of $45,359,000 is also a new record. It compares with net income of $35,660,000 in the first six months of 1953.

Provision for estimated federal taxes on income totaled $54.3 million in the first six months of 1954 against $59,755,000 a year ago.

Quebec-Labrador Ore Flows to U.S.

Movement to East Coast and inland mills may reach 2 million tons in 1954. Most will go via Atlantic ports



High grade iron ore from Quebec-Labrador can move to inland blast furnaces in competition with ore from the Upper Lakes area. Water distance from Seven Islands to Ashtabula on Lake Erie is 952 miles, from Duluth 876 miles—a difference of 76. First shipment of 20,065 tons on the *S. S. Hawaiian* left Seven Islands July 31 for unloading Aug. 5 at Pennsylvania Railroad's new terminal in Philadelphia and transshipment to inland mills. Hollinger-Hanna will shoot for 2 million tons in 1954, of which 150,000 tons will go to Lake Erie ports by small canalers. Larger vessels will take over when St. Lawrence Seaway is completed

"IT'S THE CULMINATION of a dream!" said Secretary of the Treasury George M. Humphrey July 31 at Seven Islands, Que., at ceremonies sending the first 20,065-ton cargo of Quebec-Labrador iron ore on its way to U. S. steel mills via Philadelphia.

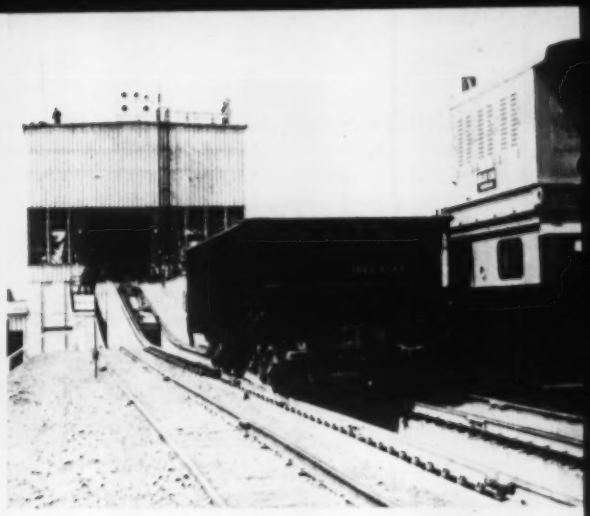
The former president of M. A. Hanna Co. was thinking back 12 years. Then, he and Jules R. Timmins of Hollinger Consolidated Gold Mines Ltd. laid plans to bring ore from the rich deposits straddling the Quebec-Labrador border.

Difficult Task—The deposits were in bush country 250 miles south of Ungava bay and 320 air miles north of tidewater on the Gulf of St. Lawrence. Construction started Oct. 2, 1950, when a coastal steamer unloaded the first equipment at the 300-year-old fishing village of Seven Islands. It's now a booming town of over 5000.

The $250-million investment of five American steel companies and 19 American and Canadian insurance companies has been spent for dock, terminal and power facilities; 357 miles of mainline railroad; preparation for open-pit mining; and exploration.

Rich Reserve—The main ore zone in the Knob lake area is 80 miles long and 6 miles wide. It lies in a larger iron formation 225 by 30 miles. Forty-four proved ore bodies contain at least 417 million tons averaging 59.53 per cent iron, dry analysis. First ore shipped comes from the Gagnon deposits in Quebec

The village of Seven Islands is destined to become one of the busiest ports in North America. Its dock can handle 8000 tons of ore an hour



Car dumper at Seven Islands, Que., terminal can handle 100 an hour. Cars are moved by pusher locomotive to foot of ramp, then to dumper by Barney hoist

and Lake Ruth deposits in Labrador.

Six-yard shovels load 34-ton trucks that haul the ore from the pits to a screening and crushing plant. Conveyors carry processed ore to a loading pocket for dumping directly into cars.

Railroading—Trains are made up of 100 to 115 cars each carrying 85 gross tons. Each train is hauled to Seven Islands in 15-16 hours by four diesels. Seven to nine trains a day will be needed to move 10 million tons a year during the 165-day mining season.

At Seven Islands, the trains roll into a receiving yard holding 625 cars. Cars then are switched into a classification yard by groups according to ore analysis. The classification yard holds 700 cars.

Diesel-powered, side-arm pusher locomotives running on narrow-gage tracks between the standard-gage tracks move two cars at a time to the foot of the slope leading to the dumper house. From that point they are pushed up the slope by a Barney hoist. The dumper has a capacity of 100 cars per hour. Cars entering the dumper house push the empties onto a sloping track leading to a yard a half mile away.

From the cars the ore falls on grizzlies which permit finer ore to fall into hoppers. Larger lumps are crushed into sizes not exceeding 5 inches enroute to hoppers.

The System—Ore scheduled for stockpiling drops from the hoppers to a conveyor and then to stackers and the stockpile. Ore for shiploading moves via a set of conveyors to a pair of mixing bins.

Two separate conveyor lines along the face of the shipping dock move the ore from the mixer bins to loading conveyors. Each has capacity of 4000 tons an hour. These loaders are mounted on tracks and are self-propelled to place the ore in any hatch without moving the ship.

The Schedule—First ship loaded at Seven Islands July 31, the *S.S. Hawaiian*, carried 20,065 tons and unloaded at the new Pennsylvania Railroad terminal in Philadelphia Aug. 5. From there ore was shipped by rail to Armco, Wheeling and Youngstown Sheet & Tube. Two sister ships, the *Texan* and *Californian*, also will be in the Philadelphia service. They can make a round trip in nine days.

About 150,000 tons will move to Buffalo, Ashtabula and Cleveland this year on small canalers carrying about 2300 tons. First cargo left Aug. 2. Bethlehem has a 25-year contract with Hanna for 30 million tons on which it will take delivery in its own vessels. First cargo leaves Aug. 9.

Production will be allocated this way: Hanna 27 per cent; Republic 25; National 20 (Weirton 12, Great Lakes 8); Youngstown Sheet & Tube and Armco 10 each; Wheeling 8. Each of these companies owns blocks of stock in the Iron Ore Co. of Canada that handled financing. Republic has 16.67 per cent, National 13.5, Youngstown and Armco each 6.67. Operations are managed by Hollinger-Hanna Ltd., equally owned by Hollinger Consolidated and M. A. Hanna through a subsidiary, Hanna Coal & Ore Corp.

All After Ore

Besides Hollinger-Hanna Ltd., there are several other companies probing the Quebec-Labrador iron ore deposits.

Newfoundland & Labrador Corp. Ltd., headed by V. P. Geffine of Cleveland, holds the largest concession in Labrador. Canadian Javelin Foundries & Machine Works Ltd. holds rights to a 100-million-ton deposit of lean iron ore. U. S. Steel Corp. has mineral exploration forces in the Quebec-Labrador area. Fenimore Iron Mines Ltd.'s Ungava Copper Corp. Ltd.; Holannah Mines Ltd., another Hollinger-Hanna joint venture; and parties working on deposits under lease to Cyrus Eaton are exploring the mineral deposits of northern Quebec.

Fenimore and Eaton see European steelmakers as the logical customers for their iron ore output.

Other minerals which have been uncovered in the search for iron ore include copper, zinc and titanium. In the northern Quebec area, test drillings have brought up samples of gold and silver as well.

By E. C. KREUTZBERG Washington Editor

Manufacturers May Get Peek at Confidential List of War Needs

A CHANGE IN POLICY may allow certain manufacturers to see at least parts of the Defense department's highly confidential "Preferential Planning List." Purpose of the peek would be to line up qualified producers of essential war materiel in advance of an emergency.

By choosing producers for essential items now, the Defense department also would expedite the task of advance planning for materials and components and equipment.

Helpful as this industry look-see at the "Preferential Planning List" would be to the Defense department, the real pressure for the move has come from top management of private firms. Those civilian planners are fearful of severe wrenches to their organizations in event of another all out war production period. They're extremely anxious to line up enough defense work now to minimize any such shocks later; they believe a look at the PPL would help them do just that.

How To Be Preferred . . .

Certainly many companies would find many opportunities for wartime business if permitted to examine this list. Well over 1000 military end-items needed in large quantities in event of another war are tabulated in the "Preferential Planning List." That includes many new weapons. At least 200 more items have been nominated for the list and are under study, with more to be singled out soon. It may eventually contain as many as 3000 items, depending on how many components are classified as end-items. For example, aircraft engines and fire control assemblies may be considered as only components or as complete end-products.

Bulk of the list includes items fabricated from metals. To get on the list, items must conform to one or more of the following criterions: They must require a long lead-time; they must be required far in excess of peacetime needs; production of such items must involve conversion of an industry or of a number of plants within an industry; they must necessitate materials or techniques essentially different from those in current use; they must require large quantities of critical or strategic materials; or they must be items on which industry does not have production experience.

Management's Purpose . . .

Most of the companies which want to look over the PPL are multiplant organizations. Their diversified facilities would enable them to undertake the production of many different military end-items simultaneously. Many of those firms already have definite assignments under the Defense department's Production Allocation Program for the production of certain end-items and already have plans to convert to such war production with the least delay possible. The catch is that, in most cases, those assignments would engage only a portion of the capacity of the companies involved.

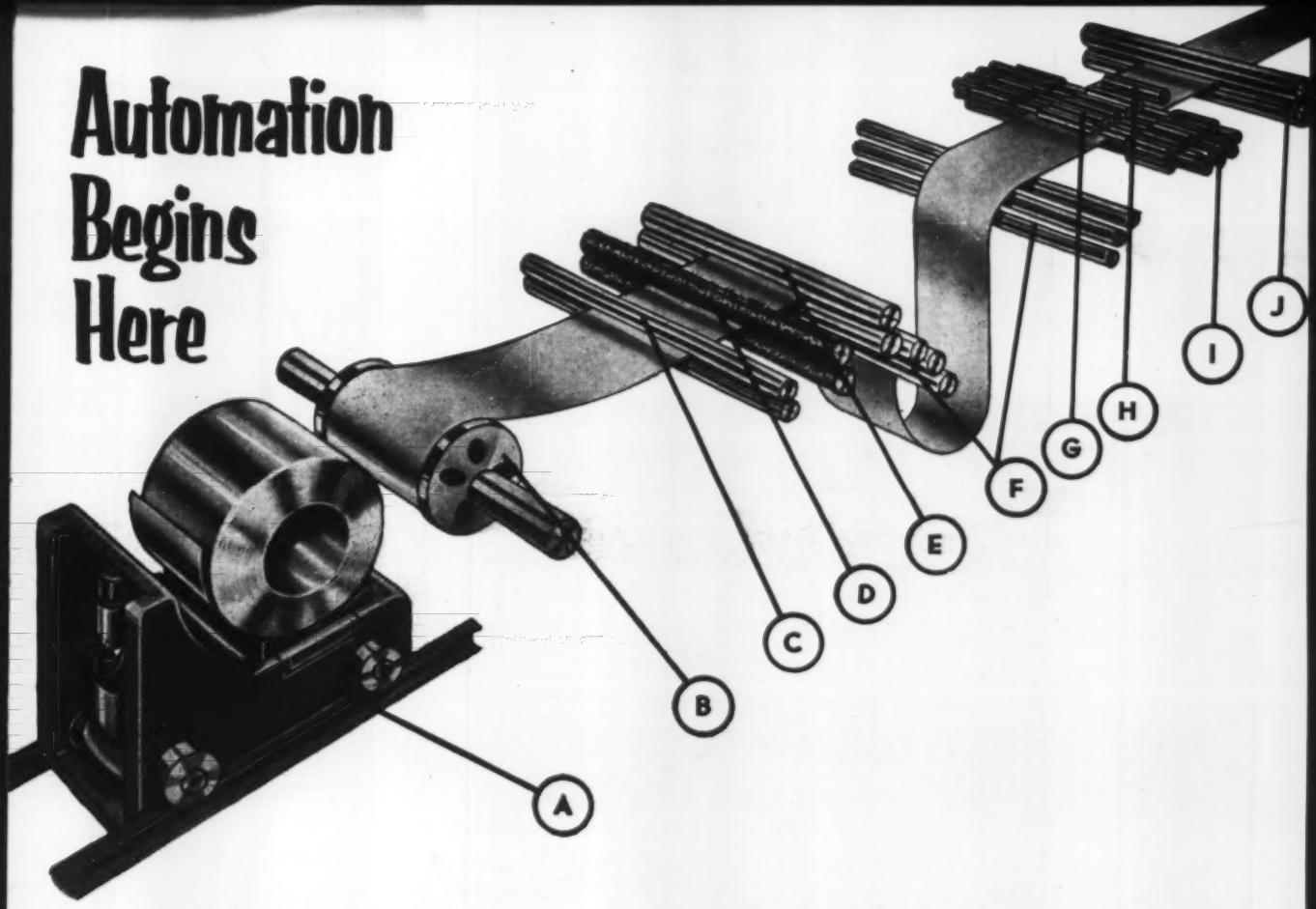
Thus these companies would like to line up more deals under the Production Allocation Program. In fact, a number of them have appointed mobilization planning co-ordinators whose purpose is to line up sufficient work to keep the company's plants busy under war conditions.

Presidential and congressional concern during the past few weeks over Communist expansion in southeast Asia has spurred the demand from private concerns as to what items the armed services would require in volume in event of another military mobilization. That's why the look at the PPL is so important.

Step Into the Program . . .

Manufacturers interested in getting war production assignments under the Production Allocation Program should contact any of the armed services procurement planning officers located at the 130 armed services procurement centers over the country. Top responsibility for the Production Allocation Program is in the Army's Assistant Chief of Staff, G-4 Logistics; the Navy's Office of Naval Material, and the Air Force's Deputy Chief of Staff for Materiel. Companies seeking a look at the PPL will have to prove a need to know what is on the list and will have to get security clearance.

Automation Begins Here



Automation—the automatic handling of work in process — permits manufacturers to combat high labor and material costs by boosting man-hour production. McKay has played a large part in this movement by designing and building "automated" equipment for the automotive and steel fabricating industries.

For example, coil feed lines of the type illustrated above were designed and built by McKay for several leading automotive firms. They are used to automatically feed coil stock into square shears or blanking presses, thus eliminating inefficient and laborious methods of manually feeding these machines.

TYPICAL LINE EQUIPMENT

(A) Hydraulic Loading Car for stand-by coil.

(B) Cone Type Coil Holder handles wide range of coil I.D.'s and O.D.'s.

(C) Guide Rolls to direct strip into brush rolls.

(D) Brush Rolls with solvent sprays to clean strip.

(E) Driven Pinch Rolls for pulling coil stock and filling storage loop.

(F) Guide Rolls to support loop.

(G, I, J & H) Feeder unit consisting of Backed-Up Leveler **(G-I)** and pinch rolls **(J)** is powered by D.C. drive which is controlled by a measuring device driven from measuring rolls **(H)**. The feeder flattens the strip and accurately measures it into open press dies or through shear knives.

Line operation is synchronized with the press or shear for maximum production. McKay builds these units with design, speed, and capacity dictated by your job requirements.

The McKAY MACHINE Company
YOUNGSTOWN, OHIO

McK

ENGINEERS AND DESIGNERS OF EQUIPMENT FOR THE AUTOMOTIVE, FABRICATING AND STEEL INDUSTRIES

SERVICE
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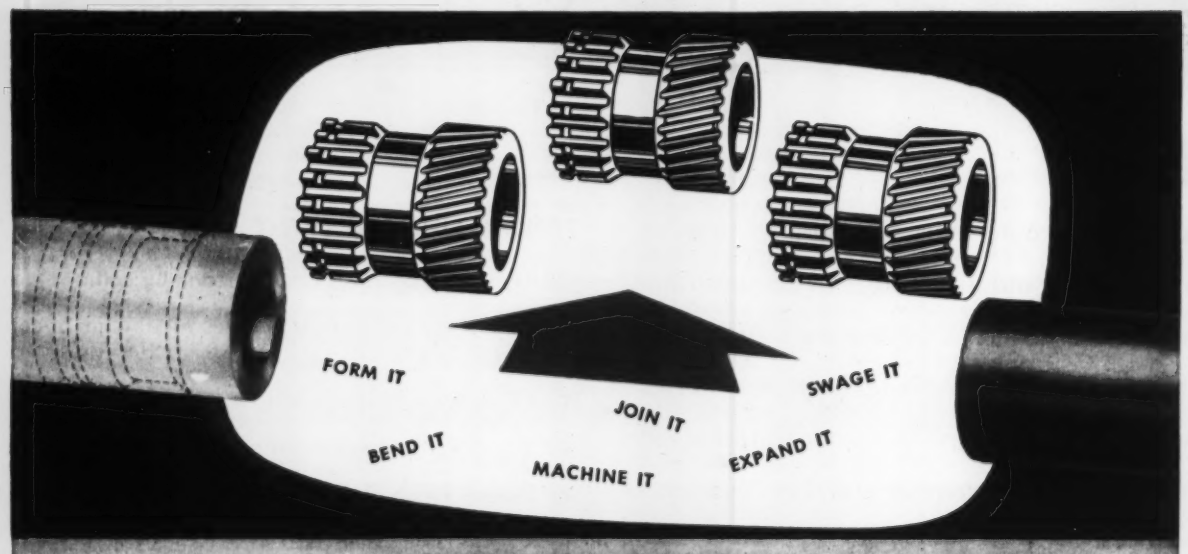
B & W
CARBON STEEL

A — AVAILABILITY
S — SERVICE
Q — QUALITY

SEAMLESS

MECHANICAL TUBING

Saves You Time and Money



B&W SERVICE INCORPORATES:

1. Sound engineering assistance on fabricating problems and procedures.
2. Mutual understanding between B&W and its tubing customers.
3. A nationwide network of district sales offices and distributors, both manned by experienced tubing salesmen.

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B&W SEAMLESS and WELDED TUBES

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing
Alliance, Ohio—Welded Carbon Steel Tubing

TA-4050 (CSM)

The Louisville Story

General Electric Co.'s Appliance Park

Four Factors Spark Its Industrial Expansion

"GOT LOUISVILLE fenced in yet?" "Can't," replied Henry C. Layne to STEEL reporters in a busy Fourth street restaurant. "It's growing too fast."

Proprietor of the Louisville Fence Co., Mr. Layne admitted he was speaking figuratively. But Louisville's industrial countenance is changing rapidly. Gone is its former complacency with its agriculture, tobacco and whiskey economy.

Above Average—Louisville's no boom town, but it is growing rapidly. A new vitality and aggressiveness characterize the city, and its business conditions during the economic adjustment have been above the national average. Consider the purchasing agents' reports on month-to-month business in the table at the right of this page.

Strength for Louisville lies in the expansion of its present industry and in its choice as a site for new industry. Four major factors of this industrial widening of the "Gateway to the South" are: Power, labor, transportation and markets. The city's industrialization sank its roots in the 1920s and grew substantially during the 1930s. But the accelerating force came with World War II and its need for more industry. That momentum hasn't slowed appreciably.

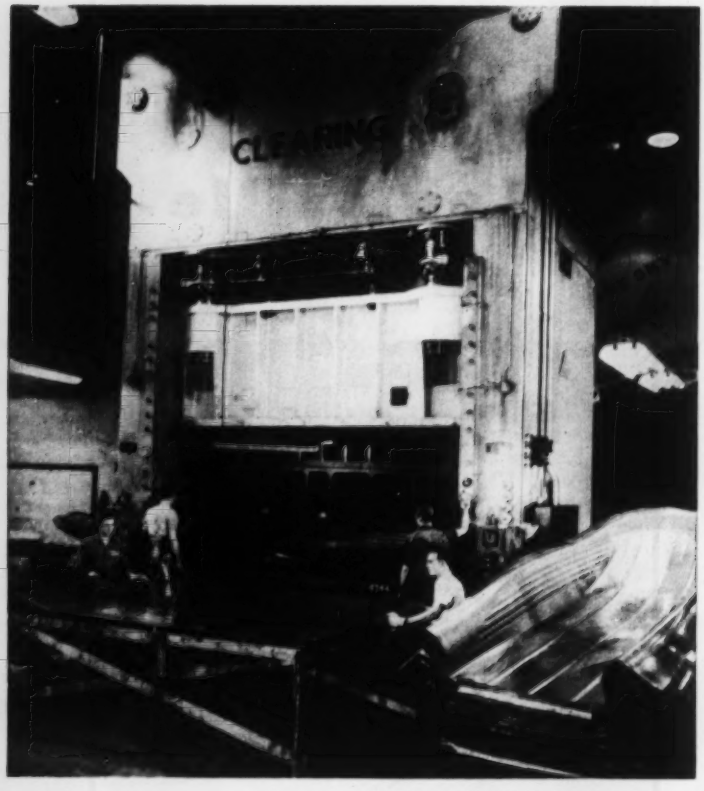
GE Impact—Best example: General Electric Co.'s new $250-million Appliance Park. With an ultimate anticipated employment of 12,000 GE will have a $100-million impact on Louisville yearly. A cab driver put it: "GE's probably the best

HOW PURCHASING AGENTS REPORT LOUISVILLE'S BUSINESS CONDITIONS

(Compared with previous month)

	As Good or Better	Worse
December, 1953	89%	11%
January, 1954	77%	23%
February	68%	32%
March	89%	11%
April	93%	7%
May	87½%	12½%
June	76%	24%

Source: Kentuckiana Purchaser



At Reynolds, 1700-ton press draws out complete hull of aluminum boat

thing that's happened to Louisville since the Kentucky Derby."

With GE, decision to locate its entire appliance operations in this city was a matter of cold facts—no special deals were made with

the city to get the company there.

Plus Factors—Checking its markets, GE found that the center of all its appliance sales fell within 50 miles of Louisville. Another check showed that Louisville has an ample labor force—not a cheap one, but one with a good record of productivity. The facilities of eight trunkline railroads, excellent truck service plus four barge lines on the Ohio river answered transportation problems. From a power standpoint, Louisville would be hard to beat anywhere in the nation, city fathers claim (see the rate comparison table on page 65.

GE purchased a 900-acre site southeast of Louisville and started construction in July, 1951. Three plants are in operation today, a fourth in partial operation and the fifth scheduled to get under way in October. By 1956, Appliance Park's construction of five factories, a warehouse and powerhouse should be complete.

Aluminum Boom—Reynolds Metals Co. is a typical example of a company that has expanded and added tremendously to the city's growth and stature. Prior to 1939 Reynolds had developed into a leading producer of aluminum foil, but produced no primary aluminum.

In 1939 R. S. Reynolds, on a European aluminum-hunting trip, noted Germany's vast increase in aluminum capacity in preparation for air warfare. Immediately Reynolds went into aluminum production with an annual capacity of 160 million pounds. During the war Reynolds produced millions of pounds of aluminum for aircraft, bombs, radio and radar and overseas packaging. Tremendous quantities of military parts were also turned out.

The Challenge — At war's end America found itself with capacity increased seven-fold, more than half in government-owned plants. With defense requirements sharply curtailed, it was commonly ex-

pected that the aluminum industry would have the light metal "running out of our ears." Supply far exceeded civilian demand.

Faced with the challenge, Reynolds set out to develop civilian markets. The company leased, reopened and later bought six government plants and increased its primary capacity to 829 million pounds per year. At Reynolds, de-

LOUISVILLE'S MAJOR FIRMS IN METALWORKING

(Employing more than 100)

Air Reduction Co. Inc.
American Air Filter Co. Inc.
American Radiator & Standard Sanitary Corp.
American Saw & Tool Co. Inc.
W. E. Caldwell Co. Inc.
Clayton & Lambert Mfg. Co.
Cochran Foil Co.
C. Lee Cook Mfg. Co.
Corhart Refractories Co. Inc.
Ford Motor Co.
General Electric Co.
Girdler Co.
International Harvester Co.
Kentucky Mfg. Co.
Kingham Trailer Co. Inc.
Logan Co.
Louisville Tin & Stove Co.
Minneapolis-Moline Co.
B. F. Avery Div.
Murphy Elevator Co. Inc.
Porcelain Metals Corp.
Reynolds Metals Co.
Schwartz Mfg. Co.
Shafer Auto Co. Inc.
Stratton & Terstegge Co.
Tube-Turns
U. S. Naval Ordnance Plant
Vogt Brothers Mfg. Co.
Henry Vogt Machine Co.
Vulcan Heat Mfg. Co.

POWER A-PLENTY—And Reasonably Priced

That's the boast of Louisville's industrial development enthusiasts. Comparative cost statistics from the Federal Power Commission's report of typical electric bills for cities over 50,000 population add support.

Service Classification	Electric Usage	Monthly Bill as of Jan. 1, 1953 National Average	Louisville
Residential	100 kwh	$3.69	$2.60
Commercial Light			
3 kw	375 kwh	$14.47	$12.75
Commercial Power			
12 kw	1500 kwh	$51.44	$43.00
Industrial			
150 kw	30,000 kwh	$602.00	$550.00
300 kw	60,000 kwh	$1,087.00	$1,003.00
1,000 kw	200,000 kwh	$3,156.00	$2,889.00

velopment and promotion of foil packaging, do-it-yourself products, furniture, and farm and building applications have appealed to the public imagination. Less well recognized are scores of other uses developed and promoted by Reynolds. Actually, three-fourths of the company's production goes into industrial products. The six Reynolds plants in Louisville employ 3500, about 13 per cent more than a year ago.

AAF Grows—Another company flexing its muscles in Louisville's development is American Air Filter Co. Inc. In the company's Louisville plant alone, its employment

rose from 663 in 1946 to 954 in May of this year. Within the past year AAF has completed a $1-million expansion program which has doubled its production capacity since 1949.

What's AAF's outlook? W. G. Frank, executive vice president, reports that in the seven months ended May, 1954, sales showed a 19-per-cent increase over the same period ended May, 1953. Says Mr. Frank: "The trend toward automation and today's industrial construction pace make our immediate outlook good. Prospects for an upturn in modernization programs after that show much promise."

Aggressiveness — Corhart Refractories Co. Inc. displays some of the aggressiveness of Louisville. Its chief markets have been the glass industries the world over. Now it's making a bid for the metalworking market with its new electrocast magnesite-chrome refractory. Hugh L. Kline, vice president-general manager, says the company is stepping up advertising and sales efforts to promote the new product and expand markets.

Employing some 2000 people in Louisville are the Girdler Co. and Tube Turns, divisions of the National Cylinder Gas Co., Chicago. Girdler has the Gas Processes Division, offering specialized design, engineering and construction services in the petroleum and chemical industries; the Votator Division, making continuous heat transfer and processing equipment for the food and chemical industries; and the Thermex Division, designing and building high frequency dielectric heating equipment.

Tube Turns—Tube Turns' products are welding fittings, flanges and commercial forgings. Chief

customers are the petroleum, power and chemical industries for fittings and the aircraft, automotive, agricultural implement and other heavy industries for forgings.

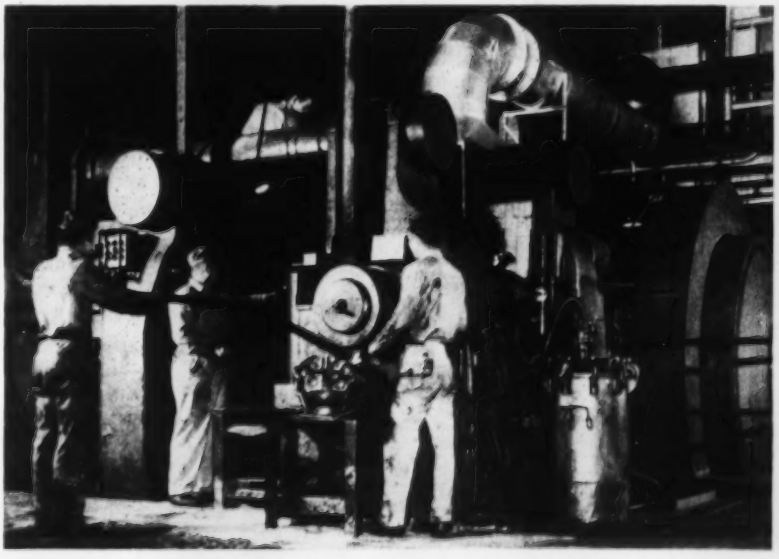
International Harvester Co. was the first major company to go to Louisville after World War II. From an original investment of $6.7 million, it has grown to an investment of $60 million in buildings and equipment to make it the largest small-tractor plant in the nation.

New Plans — Ford Motor Co. plans, too, figure in Louisville's expansion future. It has selected a site for a 1.5-million-square-foot assembly plant capable of producing 1000 cars and trucks daily.

Completion of an expansion program at the Avery division of Min-

(*Please turn to page* 80)

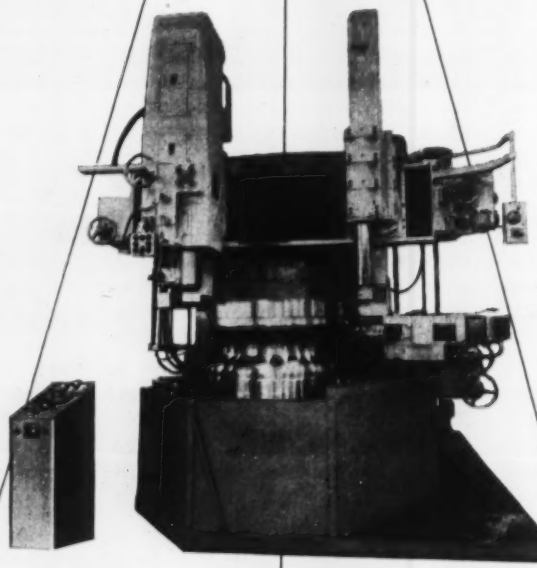
Tube Turns says its new horizontal forging machine is the world's largest. It'll forge aircraft components



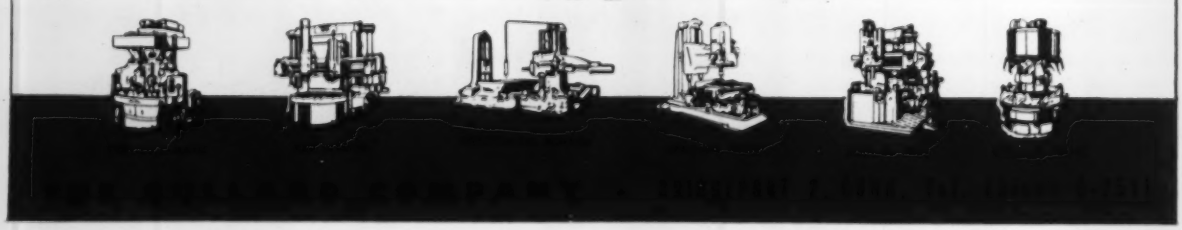
BULLARD

GRINDING AND TURNING COMBINATIONS THAT WILL PAY YOU ON THE

VERTICAL CHUCKING GRINDER



Grinding to tolerances of .00025 as determined with an electronic measuring instrument, are obtainable on Bullard Vertical Chucking Grinders. Such tolerances have been previously considered impractical on large size work. Versatility for facing or turning operations when required is available with nine different head combinations as illustrated. This demonstrates the flexibility of this superb machine to meet your particular manufacturing requirements . . . A Bullard sales engineer will gladly give you full details or write to The Bullard Company, Bridgeport 2, Connecticut, Telephone, ED 6-2511.



Ford, Chevrolet Match Western Plants for Competition Ahead

SAN FRANCISCO

JUST AS the Ford-Chevrolet midwestern battle simmers down a bit, the pair are keeping all far from quiet on the western front.

Latest armaments include a coming $1-million expansion at the Chevrolet Oakland facility countering a new Ford assembly plant at Milpitas, Calif., which will supplant the present Ford works at Richmond.

Good Punch—A real set of brass knuckles productionwise is the new Milpitas installation. With over 1.4 million square feet of manufacturing floor space under one roof and employing upwards of 5000 people, the plant will produce 880 vehicles on two-shift operation. Supplying this turnout with Ford kits will be a 500-box-car switch yard installed in what was recently a corn field.

Shaping up fast are the interesting innards of the plant scheduled to go into operation Mar. 7 next year, with about 7 miles of conveyor utilized to move things from parts to Fords. Body framing will be done at other assembly plants of the firm, with side-framing fixtures and a dolly under the floor pan providing the initial supports.

Colorful — Following the body build-up which incorporates notably modern ventilated leading and grinding booths, the shell transfers to a monorail conveyor to proceed through a phosphate machine. It then moves through a dry-off oven to a prime paint booth, where it is sprayed manually, and then to two booths for two coats of color, followed by drying ovens. The facilities are equipped to handle 15 colors piped into the booth from a mixing room about a thousand feet away.

Following paint, the bodies move to selective storage lines which will handle a total of about 50 bodies. Scheduled into final assembly, the bodies move onto one of four trim lines. The number of trim lines is dictated by the fact that the plant will turn out not only the standard passenger car bodies, but will also build bodies for station wagons, convertibles and trucks. That calls for flexibility aplenty, which means parts and space.

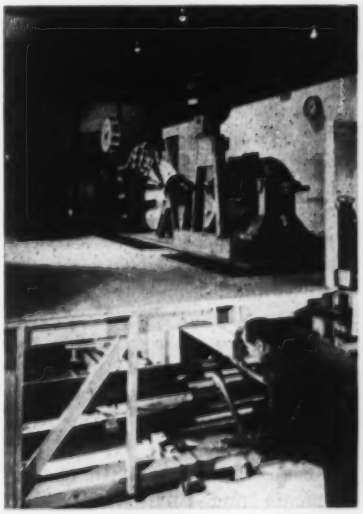
Tough Scheduling — Following the trim operation, the bodies again are shunted into one of four storage lines from which they are selected by scheduling into the final line by an operator in a pulpit. This is the point where the definitive final assembly scheduling starts, the frame being ready to meet a given body as it completes its move down the storage lines. Up to this point, the various grouping techniques useful in cost cutting are utilized with only a general production schedule.

Like the bodies, frames may be selectively scheduled from one of three frame delivery conveyors handling the frames for the myriad of vehicles to be built. With suspension elements, brakes lines, etc. added, the frame transfers to an overhead monorail for painting. Limit switches stop the floor conveyor until the overhead conveyor has removed the frame.

Tied Electronically—This plant is actually keyed together conveyorwise from start to finish electronically. By the speed of the final assembly line which is infinitely variable, the flow of all other lines is correspondingly regulated to feed in components as they are called for. In effect the plant functions as one huge assembly transfer machine, but, as with other Ford transfer equipment, inspection and repair play an important role along the way.

Every major operation area contains its own repair lines to avoid the industry phenomena of an occasional car going down the final line with fenders that don't match the body, bent hoods, etc. Each assembly department in the plant will have its own engineer and the required number of technicians to check quality as the operations are completed.

The Opponent—In the other corner at San Francisco is the Chevrolet Oakland plant, a real Horace Greeley voice in the industry that went West when Chevvie was young indeed. Growing six or seven times in floor space as wood gave way to metal bodies and production increased, the plant has always been an assembly operation. With the extensive re-evaluating occasioned by model changes over the years, the plant has well kept abreast of the way Chevvie figures a car ought to be built and is rated at 50 jobs an hour by



Blueprint in 3-D

This full-scale mockup of its dynamometer and supplemental equipment serves GM's Chevrolet Motor Division as a sort of three-dimensional blueprint. The real thing will be built into Chevrolet's new Engineering Center at Detroit. The mockup contains wooden replicas of the dynamometer, control panels and their incidental apparatus

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industry sources. That adds up to something approaching 800 passenger cars per double shift, with trucks being turned out in another building, unlike the Ford plant-to-be.

Bodies are built in the Fisher Body division plant adjacent and Fisher unloads about 21 box cars a day of Chevrolet body goodies while the Chevrolet end of things is unloading something like 25 box cars at the 50-per-hour production rate. A spokesman estimates six or seven cars in the knocked-down state can be shipped per box car compared with four completed cars so shipped. Nesting parts for shipment is so important that a gravel deflector for a new job was made in three pieces rather than one even though each must be painted separately and assembled.

The Plant — Fisher ships the bodies it builds into the Chevrolet part of the plant still on the original dolly which received the floorpan in build-up. The bodies are then moved into storage. The bodies are completely trimmed except for instruments when received by Chevrolet and include power windows where called for as well as the windshield wiper motor formerly installed in final body trim at Chevrolet. This storage line contains enough bodies to run the plant for about half an hour. Even though the bodies have required two days to build, from the time they enter the Chevrolet system they are completed cars in about two hours.

Still shipped from the East completed are station wagon and convertible bodies which Chevvie figures can be more economically built in one place. They are added to the Fisher output at the ratio of about one to eight.

Chevvie Different—With the instruments and final trim added, the body is dropped and the dolly put on a return conveyor to Fisher Body. All the body work takes place on the second floor with the body being dropped to the chassis line by an operator on the first floor unlike the single story operation at the Ford facility. Among interesting features in the chassis build-up is a welding fixture which welds 13 brackets to the frame simultaneously and a frame turnover machine which extends an arm over the frame when the lower assembly work is complete and rolls back 180 degrees, dropping the frame onto another conveyor right side up.

Recently added at the plant is a new engine dress-up line containing 25 stations instead of the former 16. Now giving greater division of operations on the present engines, the line will provide the additional space required to dress up the V-8 coming next year.

Trade Trick—One of the more unusual devices in operation at the plant is a bolt and washer assembler. Putting washers on bolts prior to assembly is a major job at many auto plants, often with both flat and lock washers required on the same bolt. The traditional method has been to have each man on the final assembly line put these parts together as the assembly was completed, frequently resulting in a washer being left off.

At Chevrolet Oakland one man now handles the assembly of all sheet metal and body screws with washers. The secret is a vibrating plate on a shaker with holes drilled the correct size to receive the screws, trepanned to receive the washers. Here's the way it works: The operator puts the washer plate onto the shaking machine and shovels washers onto the top of the plate inclined at about 30 degrees. As the washers shake down the plate, one drops into each of the trepanned holes. A second plate is then placed over the plate with the washers with holes the correct size to catch the bolts, threads down, permitting the heads to pass through for removal. When the excess bolts have shaken off the plates the operator places a third plate without holes over the whole deal so that the plates can be turned over on a bench to remove the finished bolt and washer assemblies.

Faster—Total time for 280 assemblies is now about 10 minutes compared with an hour by the old hand method. Admittedly, it's a small refinement. But multiplied many times it's the secret of the successful longevity of the Oakland plant built in 1916.

Although the Chevrolet innovations do not appear to have the sweep of the Ford changes in San Francisco, neither do they have the cost. For that reason an interesting round in the Ford-Chevrolet title fight will be coming up next year in the City of the Golden Gate.

Auto, Truck Output

U. S. and Canada

	1954	1953
January	594,789	614,000
February	573,801	628,017
March	672,485	752,149
April	676,233	782,491
May	621,249	684,843
June	623,732†	713,778
July	571,000*	757,595
August		641,152
September		605,228
October		651,153
November		457,852
December		529,588
Total		7,817,846

Week Ended	1954	1953
July 3	133,141	140,724
July 10	106,169	167,560
July 17	130,763	175,599
July 24	129,582	172,874
July 31	130,917	168,267
Aug. 7	125,000*	137,671

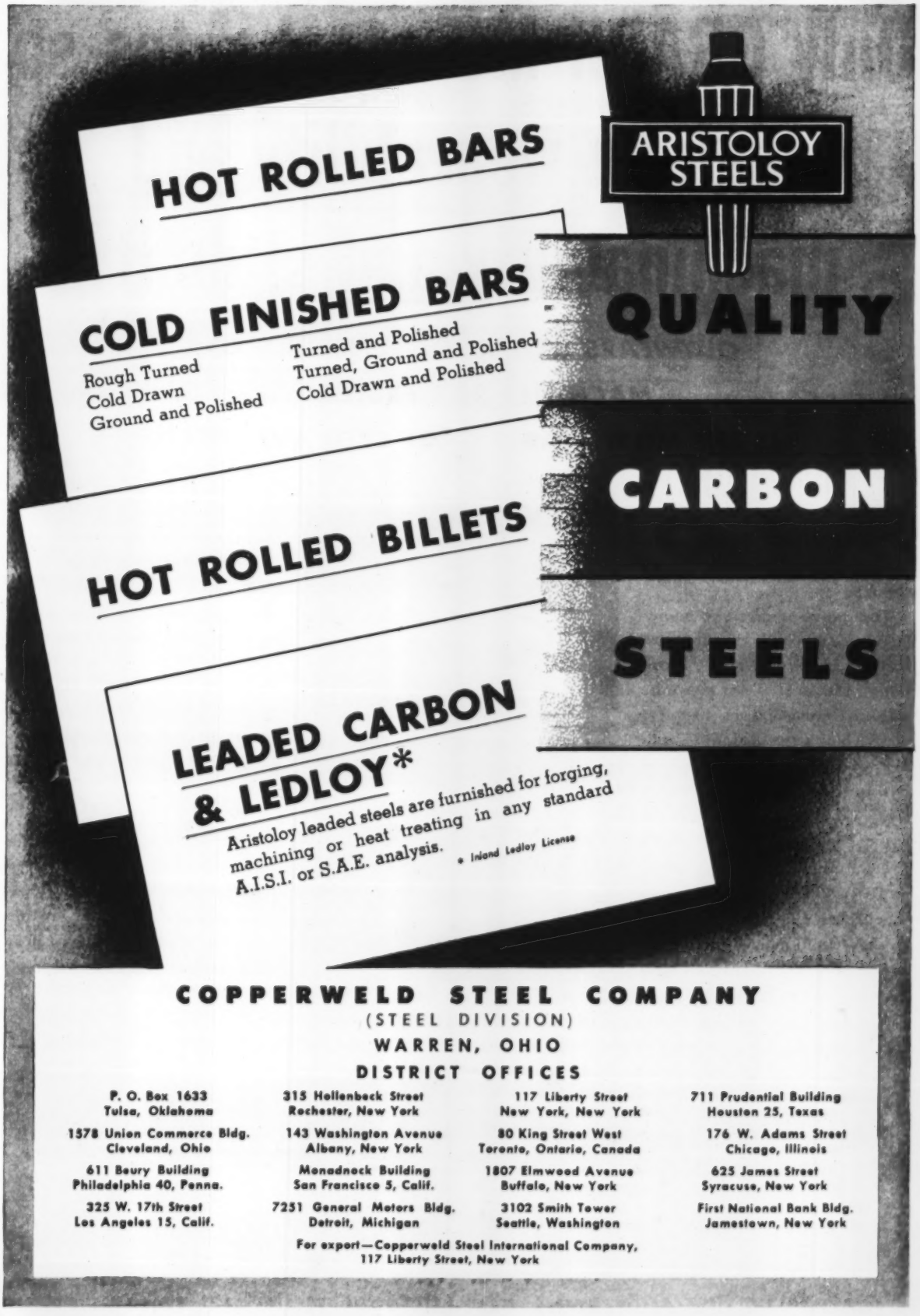
Source: Ward's Automotive Reports. †Preliminary. *Estimated by STEEL.

GM Business Continues High

Despite a decline of 22 per cent in defense sales in the first half of 1954 from same 1953 period, General Motors Corp. reports dollar sales on all products within 7 per cent of the first six months last year.

Net sales were $5066 million for the first half this year, and net income totaled $425 million after provision of $458 million for United States and foreign income taxes. This compares with $5441 million in net sales for the like period in 1953 and $313 million net income.

Slight decreases were noted in passenger car and truck and coach unit sales in the United States. During the first half of 1954, GM sold 1,525,048 passenger cars, compared with 1,539,868 during the first six months of 1953, and 229,930 trucks and coaches this year compares with 285,146 during the first half last year.



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The gages or dies you manufacture or buy will stay accurate longer if they're made from Graph-Mo steel. Tests prove its stability. For example, a typical master plug gage made of Graph-Mo steel showed less than 10 millionths of an inch variation from its original dimensions after 12 years of use!

A combination of free graphite and diamond-hard carbides in the structure of Graph-Mo steel makes it wear longer. Reports from users show that Graph-Mo steel outwears other tool steels on an average of 3 to 1.

The free graphite particles cut production time, too. Constant Pressure Machinability tests show that Graph-Mo steel machines 30% faster than other tool steels. And Graph-Mo steel has minimum tendency to pick up, scuff or gall. Graphite particles act as a "built-in" lubricant. Tests on Amsler Wear Machine show Graph-Mo steel has twice the resistance to galling when compared with ordinary tool steels.

Graph-Mo steel master plug gage (above) used in 12-year stability test. Photomicrograph (below) shows free graphite and diamond-hard carbides that give Graph-Mo unusual wear resistance.

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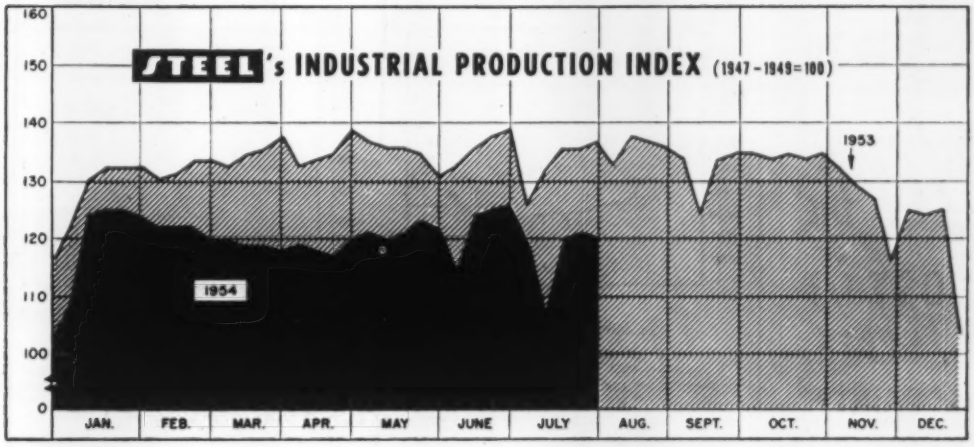
You can always tell Graph-Mo steel by its "graphitic look"—the tiny, scattered, parallel marks barely visible on a piece of polished Graph-Mo. Insist on this built-in "trade-mark" the next time you buy gages or tool steel.

For more information, write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



* Week ended July 31.

Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 11%.

Third-Quarter Profits: Lower But Still Good

SALES AND PROFITS in metalworking will hit their lowest point of 1954 in the third quarter, but they'll still be pretty good. And the memory of a surprisingly good second-period showing and a definite promise of an upturn in fourth quarter will soften the blow. Fourth quarter could easily be the best of the year, especially with a pickup in autos and steel in the offing.

There will be a few exceptions to the general trend, but as of now the over-all picture looks like this:

Flying High—Aircraft is one of the bright spots. Government procurement has stayed high. Most companies should show profits at least as good as in second quarter. Any increase in civilian business will be gravy, but the prospects for it are dim.

Electrical equipment is a good bet to hold the line, too. Soaring air conditioner sales early in the quarter, plus a likely late-quarter hike in television will smooth over any rough spots. High level of home construction is keeping appliances out of what could have been a deep rut.

Dip in Steel—Steel is almost certain to go down. Even the most optimistic forecasts don't see a pickup until late in the quarter. But, and perhaps even more important, when the upswing does start, it should continue. No one is predicting a return to 1953 production peaks for a while, though.

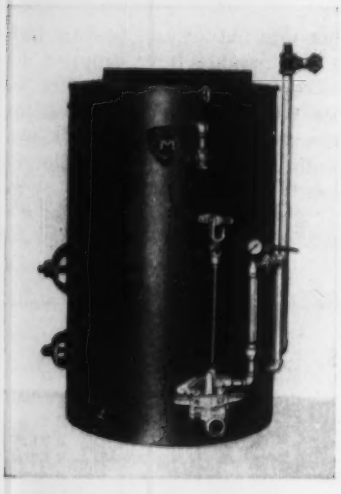
Auto industry, too, will see a dip. Production and sales have both been off from second quarter. Model changeover will put a further dent into output and profits. Sales on most makes have dropped considerably below second quarter, but this situation isn't as dangerous as a year ago when dealers were caught with heavy stocks. Current reports put the dealers in pretty fair shape, and even if reports of early introduction of new models

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,544	1,532	2,119
Electric Power Distributed (million kwhr)	8,950[1]	9,103	8,512
Bitum. Coal Output (daily av.—1000 tons)	1,171	1,200	1,529
Petroleum Production (daily av.—1000 bbl)	6,260[1]	6,268	6,557
Construction Volume (ENR—millions)	$262.3	$259.3	$253.5
Automobile, Truck Output (Ward's—units)	130,917	130,744	168,267
TRADE			
Freight Car Loadings (unit—1000 cars)	687[1]	684	794
Business Failures (Dun & Bradstreet, no.)	195[1]	188	182
Currency in Circulation (millions)[3]	$29,776	$29,854	$30,044
Dept. Store Sales (changes from year ago)[3]	+1%	+5%	+5%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$17,630	$19,973	$16,524
Federal Gross Debt (billions)	$270,839	$270,901	$272,617
Bond Volume, NYSE (millions)	$18.3	$19.6	$11.4
Stocks Sales, NYSE (thousands of shares)	13,049	12,881	5,800
Loans and Investments (billions)[4]	$81.1	$81.1	$80.0
U. S. Gov't. Obligations Held (billions)[4]	$34.0	$33.5	$32.9
PRICES			
STEEL's Finished Steel Price Index[5]	195.87	195.87	189.38
STEEL's Nonferrous Metal Price Index[6]	215.4	215.8	207.4
All Commodities[7]	109.7	110.2	110.5
Commodities Other Than Farm & Foods[7]	114.2	114.2	114.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1954, 2,384,549. 1953, 2,254,459. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

"SAVES UP TO 50% OF THE FORMER COST OF REMOVING SCALE, DIRT, RUST & PAINT!" —*Say Users of* MACLEOD Type "H" BLAST CLEANING MACHINE



"Blast cleaning with the modern Macleod equipment has cut my costs in half. I should have discarded my old-fashioned cleaning methods years ago"—a typical comment from a satisfied Macleod user.

Low initial cost, low-cost operation and superior blasting efficiency are the secrets for the popularity of the Macleod Type H blast cleaning machine. One of its economy features is the positive shut-off valve that stops abrasive flow without releasing the air pressure within the blast tank.

The Macleod Type "H" machine is available in two standard sizes (8.5 cu. ft., and 10 cu. ft.) or in special capacities on request. It can be furnished either as a portable or stationary machine. Macleod also offers a complete line of other blast cleaning machines, cabinets, and rooms to meet every need.

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Send this coupon for MACLEOD Bulletin No. 200—BLAST CLEANING MACHINES

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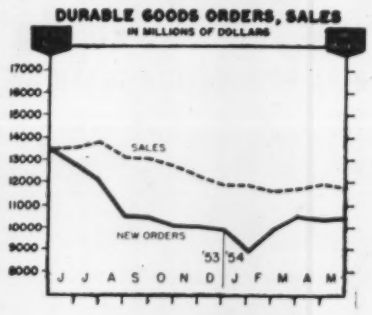
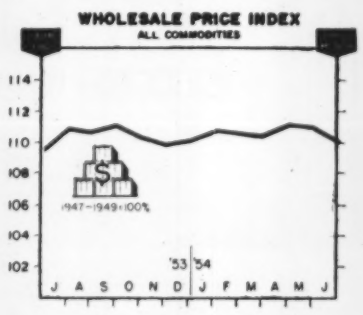
THE BUSINESS TREND





In Millions of Dollars*

	New Orders 1954	New Orders 1953	Sales 1954	Sales 1953
Jan.	8,475	12,454	11,580	12,508
Feb.	9,629	12,416	11,278	12,666
Mar.	10,206	12,520	11,385	12,116
Apr.	10,021	12,702	11,502	13,398
May	10,144	13,101	11,371	13,148
June	....	12,392	.....	13,166
July	....	11,600	.....	13,410
Aug.	....	10,139	.....	12,730
Sept.	....	10,110	.....	12,698
Oct.	....	9,677	.....	12,376
Nov.	....	9,631	.....	11,867
Dec.	....	9,567	.....	11,576

*Seasonally adjusted. U. S. Bureau of Business Economics.

	1954	1953	1952
Jan.	110.9	109.9	113.0
Feb.	110.5	109.6	112.6
Mar.	110.5	110.0	112.3
Apr.	111.0	109.4	111.8
May	110.9	109.8	111.6
June	110.0	109.5	111.3
July	....	110.9	111.8
Aug.	....	110.6	112.2
Sept.	....	111.0	111.7
Oct.	....	110.2	111.1
Nov.	....	109.8	110.7
Dec.	....	110.1	109.6

U. S. Bureau of Labor Statistics.

Charts Copyright 1954 STEEL.

slow sales still further the dealer won't be too hard hit.

No Boom—Railroads, which made a fair showing in second quarter, will hold their own in this one. Gains should show up in fourth quarter. As a result their suppliers can look forward to better things then—nothing approaching a boom, however.

Machine tool producers should hold their own in the present quarter, but here a big upswing won't come along as soon as in other industries. The longer run looks good, especially since passing of the new tax bill allowing faster depreciation.

Over-all forecast: Third quarter —poorest of the year, but still pretty good; fourth quarter—definite pickup.

Construction Slips . . .

Heavy construction contracts are falling off their record-breaking pace, but this industry will remain one of the major props in the economy. The $262 million in awards chalked up for the week ended July 29 is still very respectable even though only about two-thirds the level of a few weeks ago.

A steep drop in federal awards accounted for much of the latest week's loss, according to *Engineering News-Record*. But Commerce Secretary Weeks' remark that the goverment is going to give business "a little nudge" by speeding up spending may indicate a coming revival.

Housing and highway building have helped hold up totals, but commercial and industrial awards have dropped off. Public building other than housing has held steady.

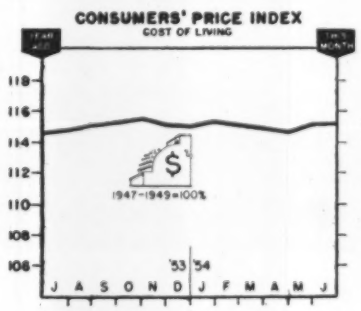
Chances are that total awards will hold at about present levels for the rest of this quarter. Awards in the first 30 weeks of 1954 hit $8.1 billion, off 9 per cent from 1953, but third highest on record.

Electricity Sets a Record . . .

Hot weather and big sales of air conditioning equipment are showing up in increased use of electric power.

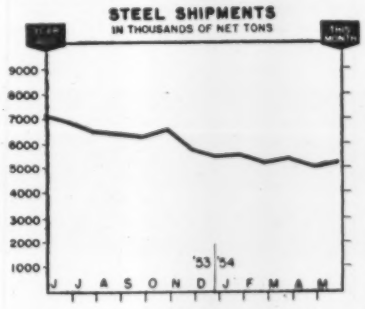
The new record of 9103 million kilowatt-hours set in the week ended July 24 was against the usual trend. Records are usually set in the bleak months of winter (previous one of 9014 million kwhr was recorded Jan. 16).

Most of the increase was in the South and West. East and Mid-



	1954	1953	1952
Jan.	115.2	113.9	113.1
Feb.	115.0	113.4	112.4
Mar.	114.8	113.6	112.4
Apr.	114.6	113.7	112.9
May	115.0	114.0	113.0
June	115.1	114.6	113.4
July		114.7	114.1
Aug.		115.0	114.3
Sept.		115.2	114.1
Oct.		115.4	114.2
Nov.		115.0	114.3
Dec.		114.9	114.1

U. S. Bureau of Labor Statistics.



Net Tons

	1954	1953	1952
Jan.	5,727,600	7,067,636	6,589,193
Feb.	5,364,978	6,533,227	6,358,293
Mar.	5,583,690	7,436,919	6,890,391
Apr.	5,287,972	7,162,460	5,922,173
May	6,423,168	7,209,396	5,947,450
June		6,950,059	1,250,243
July		6,582,513	1,413,672
Aug.		6,498,605	6,312,118
Sept.		6,400,757	6,542,147
Oct.		6,726,850	7,155,611
Nov.		5,903,980	6,647,725
Dec.		5,684,920	7,105,382

American Iron & Steel Institute.

west are still running below last year in spite of hot weather. The reason: Lower industrial activity.

High consumption of electricity has been the factor holding STEEL's industrial production index at about 120 since the Fourth of July holiday week. Steel and auto output and revenue freight car loadings, the other items in the index, still are below preholiday levels.

No marked pickup in the index is likely before late August.

Employment Gains a Little . . .

Seasonal upswing in employment is smallest in years, but this was expected in view of the current business situation. Layoffs in June were the highest in 5 years and hiring was at a postwar low, which combined to make the net gain for the month smallest of the postwar period.

But an encouraging factor is that most industry groups took part in the seasonal boost, the Labor department reports. Hiring was especially strong in electrical machinery, transportation equipment, chemicals, furniture and petroleum. But disappointing is the fact that most of these same industries also showed the highest layoffs.

The big boost in employment is expected in September. Auto industry should show a marked increase especially as early production of new models will be at stepped-up rate. The unemployment picture should improve also as students go back to school.

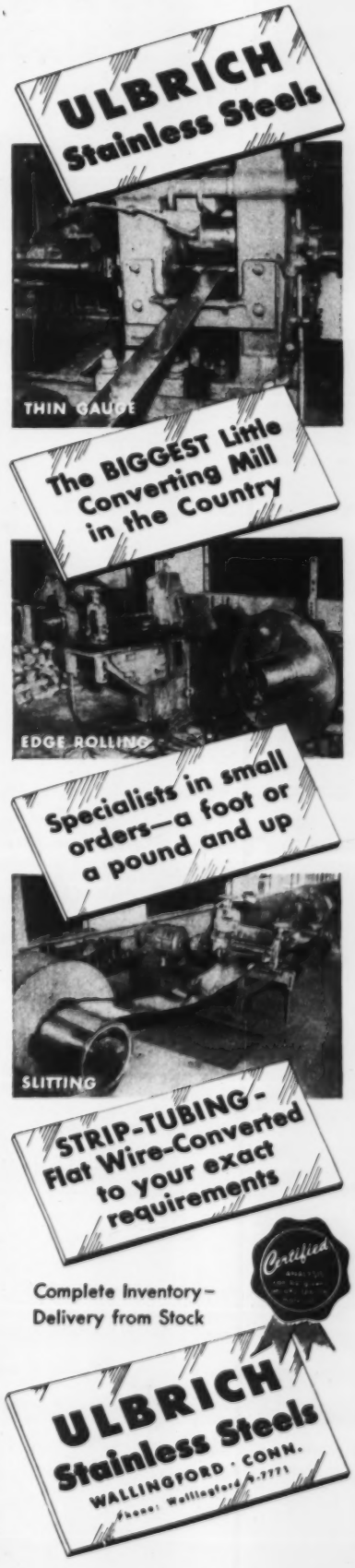
Dividends Go Up . . .

Cash dividend payments in first half of 1954 were 7½ per cent above a year ago, says Office of Business Economics. This is partly because of good earnings and higher rates per share.

But there's also a gimmick: A considerable number of firms put off paying dividends in December, 1953. Instead, they paid off in January of this year.

Consumer Credit Up . . .

Consumer credit went up $178 million in June with auto buying accounting for $142 million of the increase. This is far below gains in 1953 and 1952 of $422 million and $732 million, respectively, and is probably the last large gain until fall introduction of new model cars and appliances.



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"New twist" cuts assembly costs 63% on Awnair Adjustable Awnings

How to assemble adjustable awnings faster, easier and at lower cost? This 3-way challenge was met recently by engineers of the Awnair Corporation of America, Wayne, New Jersey. Playing leading roles in this success were Tinnerman SPEED NUTS!

Standard Push-On type SPEED NUTS were recommended for eight fastening applications. And three specially developed SPEED NUT brand fasteners put a "new twist" in the awning adjusting mechanism. They provide lightning-fast, rust-resistant, rattle-proof attachments. They also eliminate costly sawing, drilling, tapping, clinching and sanding operations.

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Your Tinnerman representative will be glad to help you locate fastening savings in your product assemblies. Ask him for complete details on our Fastening Analysis Service!

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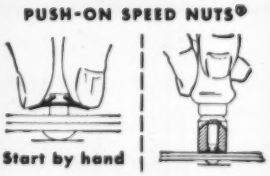

. . . zip over integral studs, rivets, tubing, or other unthreaded parts; bite into smoothest, hardest surfaces—lock with firm spring tension on metal, plastic or wood. Eliminate costly inserts in plastics; save machining of die castings!

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TINNERMAN Speed Nuts®

MORE THAN 8000 SHAPES AND SIZES

WALTER E. JONES
. . . Carboloy mgr., vacuum melted eng.

S. A. GIRARD
. . . Kaiser-Willys general manager

ROBERT B. WITTENBERG
. . . Great Lakes Carbon officer

Walter E. Jones was appointed manager of vacuum melted products engineering at **Carboloy Department,** General Electric Co., Detroit. He has been metallurgical development engineer at GE's Thomson Laboratory at Lynn, Mass.

Arthur Tobin succeeds **Stewart Barton** as central district manager, Detroit, for **Fellows Gear Shaper Co.** Mr. Barton is assistant sales manager there.

J. A. MacIntire Jr. was promoted to manager of the Chicago district, **Republic Rubber Division,** Lee Rubber & Tire Corp. He succeeds **M. W. Clark,** retired. Mr. MacIntire joined Republic in 1953 and has been assistant manager of wire braid hose sales.

E. T. Larsen and **Dr. W. C. Rueckel** were named vice presidents of **Henry J. Kaiser Co.,** Oakland, Calif. As manager of engineering, Mr. Larsen is responsible for engineering activities for Kaiser Engineers, a division. Mr. Rueckel, formerly a division manager for Kaiser Engineers, was made manager of development and sales. Both are located at Oakland.

International Business Machines Corp., New York, elected as vice presidents **John J. Kenney,** former general service manager, and **William W. McDowell,** former director of engineering.

S. A. Girard was made general manager in charge of **Kaiser-Willys'** Toledo, O., automotive operations, Kaiser Motors Corp. A Kaiser Motors vice president since 1951 and a vice president of the subsidiary, Willys Motors Inc., since 1953, Mr. Girard has been executive assistant to the president for the last year. His appointment as general manager fills a post vacant since resignation last spring of **Raymond R. Rausch.**

Everett H. Shands was appointed midwest district manager of porcelain enamel frit sales and service for **O. Hommel Co.** He has headquarters in Chicago.

Lawrence J. Straw is the new general sales manager, **Standard Piezo Co.,** Carlisle, Pa.

David L. Wilkoff succeeds **Joseph Wilkoff,** retired, as president of **Wilkoff Co.,** Pittsburgh scrap and steel warehousing firm. **Lee Wilkoff** was elected executive vice president and **C. L. Robinson** secretary-treasurer. The new president also heads David L. Wilkoff Co., Pittsburgh, and David L. Wilkoff Co. of New York, exporter and importer.

Connor Spring Mfg. Co., manufacturer of precision springs, named **Lawrence V. Lindelof** supervisor of production control and quality control at its Los Angeles plant.

Robert B. Wittenberg was elected a vice president of **Great Lakes Carbon Corp.,** New York, and appointed general manager of its electrode division which has plants at Morganton, N. C., and Niagara Falls, N. Y. He has been general manager, chemical division, General Tire & Rubber Co., since 1951.

Dobeckmun Co., Cleveland, promoted **Robert Droney** to the newly created position of assistant district manager for the industrial sales division in New York.

Wallace E. Powell, as president, heads the newly formed **Control Products Co. Inc.,** Oakdale, Pa. Concerned with automation of manufacturing processes, the new firm will design and manufacture automatic control systems for the steel, nonferrous, electrical, oil, chemical and other process industries. Mr. Powell formerly was a control systems engineer for Jones & Laughlin Steel Corp.

Edwin Heffner joins **Osco Steel Co.,** Cleveland, as assistant to the president. He has been Cleveland district manager of United States Steel Supply Division, U. S. Steel Corp., since 1938.

Aubrey Phillips was named manager of **Allis-Chalmers Mfg. Co.'s** general machinery division district sales office in Milwaukee. He managed the Houston district office for

RAYMOND D. LINDSTROM

JOSEPH B. CLOUGH

. . . new vice presidents at National Tool Co.

the last eight years. In his new post Mr. Phillips succeeds **J. H. Burrus Jr.**, recently appointed manager for the midwest region.

Raymond D. Lindstrom was elected vice president-manufacturing and **Joseph B. Clough** vice president-sales at **National Tool Co.**, Cleveland. Mr. Lindstrom has been factory manager since 1949, and Mr. Clough, since 1950, has been director of sales.

Elected to the board of **McCulloch Motors Corp.**, Los Angeles, are **C. F. Breer**, vice president-sales, **S. H. Egbert**, vice president-manufacturing, and **J. L. Hegener**, secretary-treasurer.

Arthur Nichols was named a vice president of **Kurt Orban Co. Inc.**, New York. He continues to supervise sales in southern Florida and, in addition, company operations in Texas. **Joseph A. Reagan** was made southern Florida branch manager.

Standard Railway Equipment Mfg. Co., Chicago, appointed **C. M. Smith** materials manager, responsible for purchasing, routing and shipping of materials and for production control. He joined Standard Railway June 1 after serving as staff consultant for Booz, Allen & Hamilton.

N. C. Wiggin was appointed advertising and sales promotion manager, **J. H. France Refractories Co.**, Snow Shoe, Pa. He formerly served the advertising and sales promotion department of Rockwell Mfg. Co. and Westinghouse Electric Corp.

James A. McGowan leaves his post as assistant product manager for sand and permanent mold castings at the Vernon Works of **Aluminum Co. of America** to become assistant district sales manager, New York district. He is succeeded at the Vernon Works, Los Angeles, by **William F. Courter.**

Walter E. Gregg was made vice president and assistant general manager and **Dr. Walter L. Finlay** vice president and manager of research for **Rem-Cru Titanium Inc.**, Pittsburgh. **John M. Dempsey** was made assistant secretary.

Pittsburgh Steel Co. appointed **B. R. Hagelbarger** to the newly created position of central district sales manager for its subsidiary, **Johnson Steel & Wire Co.**, Worcester, Mass., and **C. E. Swallow** works manager of the Akron plant to replace **R. L. Brown**, resigned. **Edwin Brio** was made Los Angeles works manager to replace Mr. Swallow, and **Robert D. Barnaby** was promoted to West Coast sales representative. **W. E. Schutt** was promoted to district sales manager in Pittsburgh Steel's Cleveland district, the position formerly held by Mr. Hagelbarger.

Irving J. Minett was made operating manager of **Chrysler Corp.'s** Newark, Del., tank plant and **Hayward F. York** was made operating manager of the Detroit tank plant.

Food Machinery & Chemical Corp., San Jose, Calif., promoted **Jack M. Pope** from controller to vice president and **James N. Kirkwood** to controller.

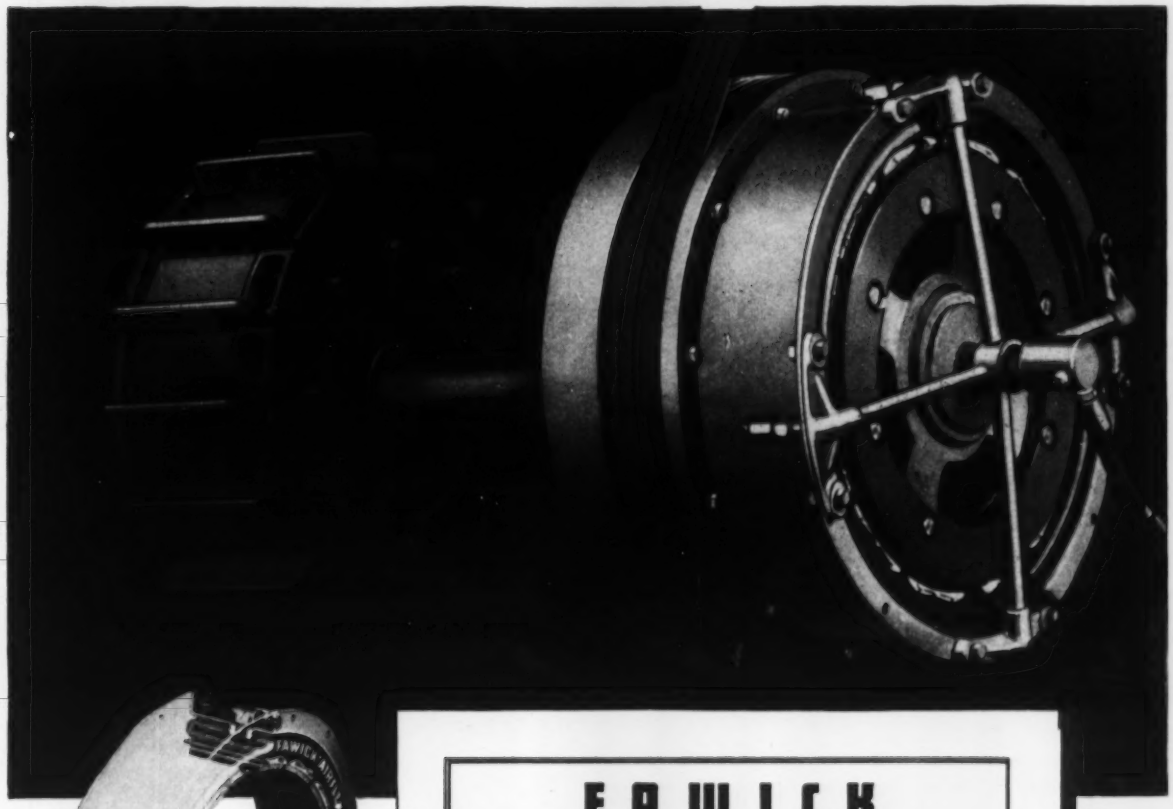
Fred J. Borch was elected a vice president of **General Electric Co.** in charge of marketing and was made manager of the marketing services division with headquarters in New York. He succeeds **John L. Busey**, vice president, who is on special assignments for the president. **M. N. Halberg**, formerly with GE's industrial engineering sec-

WALTER E. GREGG

DR. WALTER L. FINLAY

. . . Rem-Cru Titanium administrative officers

TYPICAL EXAMPLE OF FAWICK APPLICATIONS MODERNIZING PRESS EQUIPMENT



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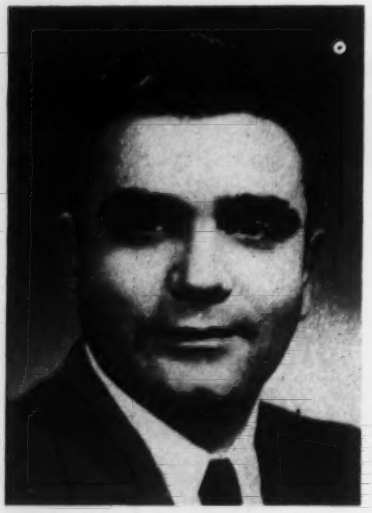


A. P. SGAMBATI
. . . Lombard Corp. chief engineer

THEODORE F. EICHSTAEDT
. . . promoted by Joseph T. Ryerson

STANISLAW T. JAZWINSKI
. . . Barium's director of research

tion, was made application engineer of the large motor and generator department.

A. P. Sgambati was promoted to chief engineer of **Lombard Corp.**, Youngstown.

At **Carpenter Steel Co.**, Reading, Pa., **Douglas R. Beggs**, personnel director, was appointed assistant to the vice president-production, and **Harold W. Miller**, formerly assistant general superintendent, was advanced to chief plant engineer. **O. T. Thompson** and **R. A. Kokat** were made assistant branch managers at, respectively, Detroit and Philadelphia.

Gene A. Zwerner replaces **C. R. Heller**, retired, as district manager of **Link-Belt Co.'s** Washington office.

Alvey Conveyor Mfg. Co., St. Louis, appointed **Robert C. Gossling** representative in its new Pittsburgh office, a branch of the Cleveland district. It is located at East and Suismon streets.

Donald F. Brickley was made manager of Region 1 of **Motorola Communications & Electronics Inc.**, Chicago. Previously zone manager in northern Illinois, he now directs activities in Idaho, Montana, eastern Nevada, Washington, Wyoming and Utah.

Victor P. Roy was appointed plant superintendent for **Universal Metal Products Inc.**, Alhambra, Calif.

Joseph T. Ryerson & Son Inc., Chicago, appointed **Theodore F. Eichstaedt** assistant manager, machinery and tool division. Since 1951 he has been Chicago manager, inside machinery and tool sales department.

A. V. Petersen was appointed sales manager of the packing machine division of **Lynch Corp.**, Toledo, O., He formerly was sales manager, compressor division.

Paul A. Miller resigned as vice president of Leece-Neville Co., Cleveland, to accept the position of manager, manufacturing-engineering, parts and equipment division at Ypsilanti, Mich., for **Ford Motor Co.**

Elbert A. Sanford, director of research for **Pfaudler Co.**, Rochester, N. Y., was elected a vice president. Vice presidents given enlarged responsibilities are **Elliott E. Geisinger**, named senior vice president, and **Claude Birch**, designated vice president in charge of manufacturing.

Gunnar B. Mohline is general supervisor of specifications and costs at the Spaulding Works of **Crucible Steel Co. of America** in Harrison, N. J.

Harry M. Jensen was made special sales representative of the lead-lined products department for **National Lead Co.'s** Atlantic branch, New York. He succeeds the late **Prescott Hendrickson.**

Stanislaw T. Jazwinski was appointed director of research for **Barium Steel Corp.'s** subsidiaries: Central Iron & Steel Co., Harrisburg, Pa.; Phoenix Iron & Steel Co., Phoenixville, Pa.; and Chester Blast Furnace Inc., Chester, Pa. He has served the companies since 1952 as chief research metallurgist.

Vance N. Wilson was appointed manager of the new **Pennsylvania Salt Mfg. Co.** plant at Chicago Heights, Ill., for which ground was broken July 8.

Rupert H. Young succeeds **Claude M. Daniels**, retired, as sales manager, plate sales department, **Bethlehem Steel Co.**, Bethlehem, Pa.

Ralph R. Hull fills a newly created post of general supervisor of sales for **Facile Corp.**, Paterson, N. J. He was formerly with Minnesota Mining & Mfg. Co.

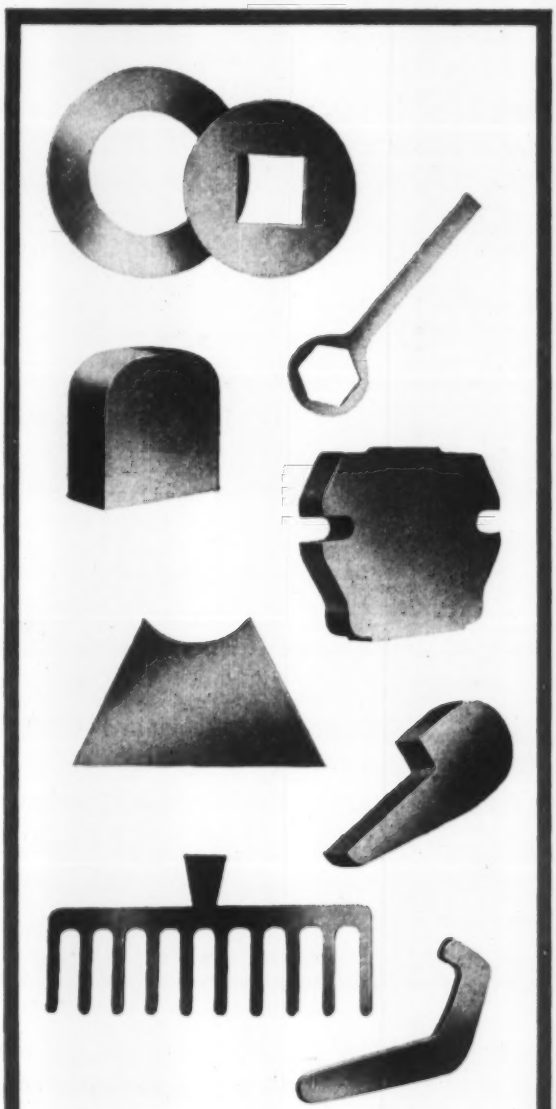
R. B. Grant was made Los Angeles branch manager for **Minneapolis-Honeywell Regulator Co.** Since 1949 he has been regional industrial manager, Pacific region. For M-H's Micro Switch Division, **Nick Kouzmanoff** was promoted from Chicago branch manager to the newly created post of Chicago area manager. He succeeds **J. V. Manning**, named general manager of the firm's marine equipment division in Seattle.

Revere Copper & Brass Inc. named **Randall L. Williams** manager of Los Angeles sales operation and

check the advantages of

FLAME CUT STEEL PLATE SHAPES

...by CLAYMONT



Our Fabrications Department is equipped to furnish you with flame cut plates in any shape, any size and in any amount . . . cut from steel and alloy plates.

Here are some of the savings and advantages you get by utilizing Claymont Sheared or Flame Cut Steel Plate Shapes:

- ✓ **Reduction of excessive material handling on your part and less storage space required.**
- ✓ **Elimination of freight charges on excess metal. Complete elimination of scrap handling on your part.**
- ✓ **No plate inventory required on your part.**
- ✓ **Minimized capital investment; elimination of extra manpower and need for patterns.**
- ✓ **Uninterrupted steel supply from our own producing facilities.**
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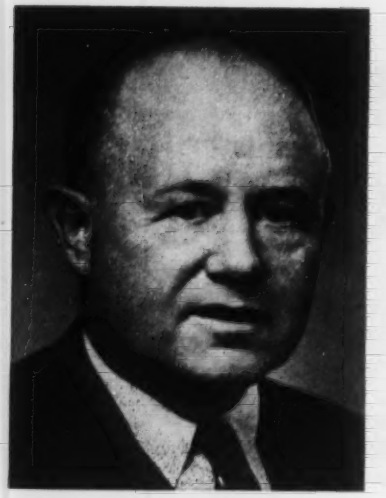
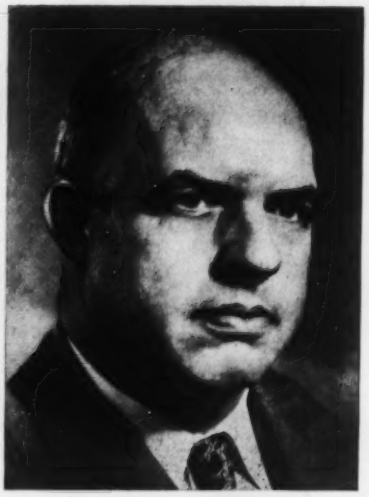


THOMAS M. BOHEN



CLAYTON D. GROVER

. . . chairman and president of Whitehead Metal Products

Donald N. Olendorf a Los Angeles sales representative.

Thomas M. Bohen was elected chairman of the board and chief officer of **Whitehead Metal Products Co. Inc.**, New York, subsidiary, International Nickel Co. Inc. **Clayton D. Grover** succeeds Mr. Bohen as president after serving since 1941 as vice president.

Ralph K. Behr will replace **H. K. Dean**, retiring Sept. 1, as manager of the Boston district office of **Babcock & Wilcox Co.'s** boiler division.

Jules F. Boand Jr. was named Pacific Coast manager of sales and technical service by **Titanium Metals Corp. of America**, located in Los Angeles.

William E. O'Connor was named a salesman for stainless steel and titanium in the Chicago district of **Republic Steel Corp.**

Joseph E. Jenkins was named manager, Washington district office, **CEC Instruments Inc.**, subsidiary of Consolidated Engineering Corp.

Wesson Co., Detroit, appointed **Paul H. Miller**, research engineer, to the research and development staff.

OBITUARIES . . .

Ralph J. Fox, 54, treasurer, **Dayton Malleable Iron Co.**, Dayton, O., died.

Harry C. Senour, 68, who retired in 1951 after 23 years as director and secretary-treasurer, **Transue & Williams Steel Forging Corp.**, Alliance, O., died July 10.

Leon A. Paddock, 75, from 1931 until retirement in 1946 a director and president of **American Bridge Co.**, U. S. Steel Corp., Pittsburgh, died July 27.

Edwin L. Ramsey, 75, for seven years a consultant for **Miller & Co.**, Chicago, died July 22. For 25 years prior to that time he was with **Wisconsin Steel Division**, International Harvester Co., from which he retired in 1947 as superintendent of steel production.

T. R. Engelhardt, 53, former partner in **Engelhardt & Russ**, machine shop, Buffalo, died July 21.

Morris Balaban, manager and part owner, **Central Precision Plating Corp.**, Utica, N. Y., died July 22.

James H. Remington, 64, president, **James H. Remington Co.**, Milwaukee, died July 24.

Clarence B. Buxton, 77, president and founder, **Buxton Tool & Machine Co.**, Buffalo, died July 26.

Willard F. Saxton, 47, president **Engineered Products Co.**, Flint, Mich., died recently. He organized the local company in 1942.

(*Concluded from page* 65)

neapolis-Moline Co. boosted employment from 450 in 1951 to approximately 1200. The expansion included a new, highly mechanized foundry.

The Effects—To a company like Logan Co., maker of conveyors and light metal products, the impact of a new company the size of General Electric is considerable. Says E. C. Logan, vice president, "We lost some skilled and technical men to GE which will take us some time to replace. However, we do welcome them as a potential long-term customer."

Expansion of the metalworking industries in Louisville has led to the establishment of four warehouses in the Louisville area: Jones & Laughlin Steel Corp., Graco Steel Co., Mansbach Steel Co. and Bridgeport Brass Co.

Setting the Pace—Acting as a hub to Louisville's expansion wheel is an aggressive Chamber of Commerce which was organized in 1950 from a consolidation of the Louisville Board of Trade, Retail Merchants Association, Convention Bureau and Area Development Association.

With a staff of 34 the C of C is constantly alert for leads to companies planning to relocate or build new plants. Rayburn Watkins, administrative secretary, states that his organization is in touch with an average of 40 companies all the time, selling the idea that Louisville's a good industrial site.

Plenty of Room—Walter Knight, research director for C of C, states that Louisville and Jefferson county have been recently rezoned with a total of 23,747 acres designated for industrial sites. According to Mr. Knight, there are over 9000 acres available for industrial expansion.

Pointing up the C of C's aggressiveness is its current campaign to expand Louisville's aviation industry. A few aircraft products are produced in Louisville, but there is no major aircraft industry. The city claims more than 60 facilities useful to an aircraft industry within a 200-mile radius of Louisville, a modern airport and adjacent land for a new plant—in fact there is an existing 122,000 square-foot building available for use already on the site.

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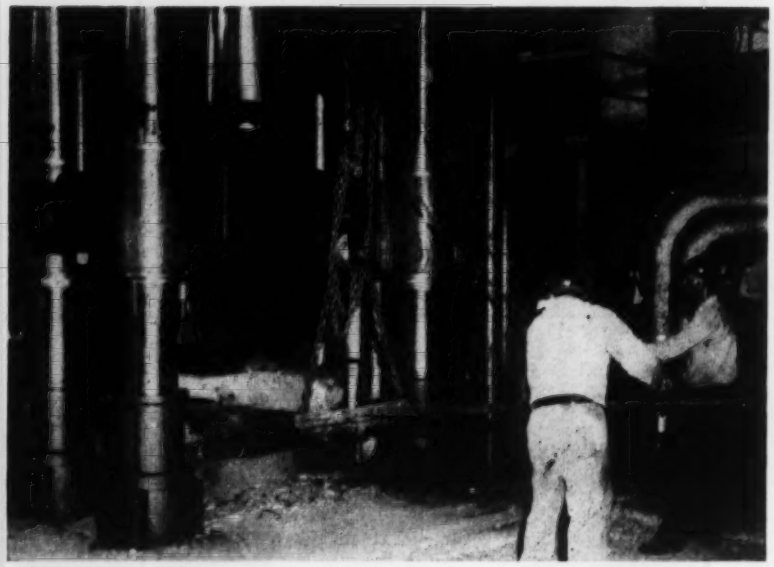

Steel ingot receives a 1000-ton pounding from . . .

Vanadium-Alloys' New Press in Canadian Plant

TOOL AND DIE STEELS are being manufactured in a full range of standard sizes and shapes in a new Canadian plant. Importance of this fact is stressed by officials of Vanadium-Alloys Steel, Canada, Ltd., London, Ont., who formally opened its plant in that city recently.

The firm has expended about $2 million to prepare the plant, in operation since April, for efficient operations. Improvement and modernization of the plant during the past 18 months and installation of new equipment has been carried out under the direct supervision of L. D. Bowman, vice president in charge of operations for both the Canadian company and the parent firm, Vanadium-Alloys Steel Co., Latrobe, Pa. L. P. Gill is president of both companies.

Facilities — Retained equipment includes a six-stand, 10-in. rolling mill; a one-stand 14-in. rolling mill; a five-stand 18-in. rolling mill; a 4000-lb hammer; two overhead cranes of 40 and 30-ton capacity.

Also added to the facilities are an 8000-lb hammer; a 1000-ton press; ingot and billet gas-fired heating furnaces; annealing furnaces; straightening equipment; lathes; roll-turning, centerless-grinding and billet-grinding equipment.

Steam to power the new plant is produced by two high-pressure boilers, each with a rated capacity of 18,000 lb of steam per hour.

In conjunction with the formal opening, officials said there will be ample stocking of tool steels at the plant as well as at the company's new warehouse in Toronto and at a warehouse now under construction in Montreal, Que.

Tube Firms Consolidate

Damascus Tube Co., Greenville, Pa., and Swan Engineering Co., Bloomfield, N. J., have consolidated to provide expanded services to their customers. This consolidation combines into one facility the highly specialized experience and techniques of tube manufacture and fabrication and, thus, provides a new source for standard and unusual pipe and tubing applications. Swan Engineering specializes in the fabrication of pipe and tubing in all metals from ⅛-in. OD to 4-in. OD while Damascus manufactures stainless tubing and pipe from ⅜-in. OD to 3-in. OD.

There will be no change in administrative or operating personnel at either plant. Philip M. Brown is president of Swan Engineering, and William B. Klee Jr. is president of Damascus Tube. Willis H. Walling, vice president of Swan, is in charge of its operations. Raymond L. Kelley is plant manager of Damascus Tube.

Zeller Buys Spark Plug Firm

Zeller Corp., Defiance, O., bought Blue Crown Spark Plug Corp., Chicago. The Chicago operations will be consolidated with those in Defiance.

Opens Screw Machine Plant

Parker Appliance Co.'s subsidiary, Eaton Screw Products Co., Eaton, O., placed its new plant in full operation, turning out tube and hose fittings for hydraulic and other fluid systems. Number of production machines has been increased from 14 to 24.

Vitreous Enamel Changes Name

Chicago Vitreous Enamel Product Co., Cicero, Ill., manufacturer of porcelain enamel frit, changed its name to Chicago Vitreous Corp.

Form Alter Waterways Terminal

Alter Waterways Terminal Corp. was organized in Davenport, Iowa, to service industries in eastern Iowa and western Illinois in the handling of inbound and outbound shipments of structural and sheet steel, aluminum, pig iron, scrap iron, ferroalloys and manufactured goods, including agricultural implements. Officers and stockholders of the corporation are the principal executive officers of Alter Co., that city. The firm's terminal will be located at Fourth street and River drive.

GE Forms New Departments

General Electric Co., Schenectady, N. Y., divided its meter and instrument department into two separate units. The meter department will make its headquarters in Somersworth, N. H., with D. E. Craig general manager; the instrument department will remain in Lynn, Mass., with C. Howard Black general manager.

GE also established a combined manufacturing and selling operation at Milwaukee for its industry

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NOTE: Electreat (the modern J&L method) is characterized by exceptionally accurate control of heating and quenching. Electreated bars can be used to produce parts having heat-treated properties—without the need for costly and perhaps undesirable heat-treating operations. For some products, you may use Electreated carbon steel in place of alloy steel.
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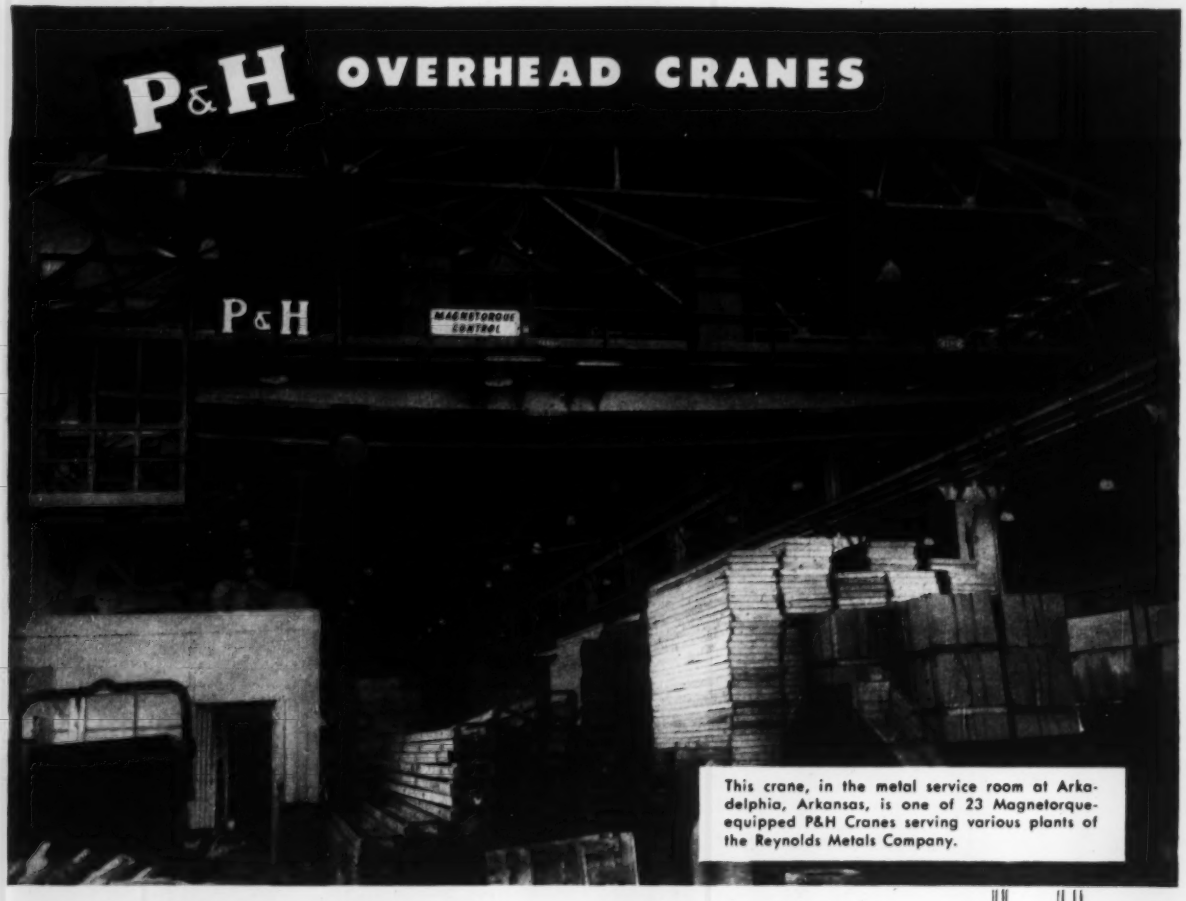
P&H OVERHEAD CRANES



This crane, in the metal service room at Arkadelphia, Arkansas, is one of 23 Magnetorque-equipped P&H Cranes serving various plants of the Reynolds Metals Company.

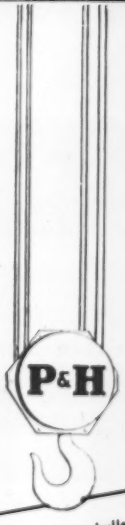
23 Modern Cranes with P&H Magnetorque® AC control now serve Reynolds Metals Company

There's no question about performance when you specify P&H Cranes with Magnetorque Control. In more than 900 installations since Magnetorque was introduced, *every single one has proved successful!*

P&H Magnetorque is the smoothest, most accurate control ever put on an overhead crane — and it's just about the simplest! Here, with the convenience and economy of AC power, you have no worries about the old mechanical load brake. It's eliminated. There are no rotating electrical parts, no friction, nothing to wear or replace, no high maintenance costs to plague you. The Magnetorque unit lasts the life of your crane!

When you own a P&H Crane, you look to this *one* dependable source for complete service on everything, including electrical equipment. For P&H builds its own — accepts the entire responsibility. P&H saves you time, trouble and money.

If your plant program involves new overhead cranes, consult with P&H in the earliest planning stages.



There's a new bulletin to give you all the latest facts about P&H Magnetorque Crane Control. Ask for Bulletin Number C39-1.

P&H OVERHEAD CRANE DIVISION

HARNISCHFEGER CORPORATION

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control department. The operation is expected to speed shipments of both standard and specialized control by gearing production more closely to the needs of the region. It also will provide job shop service on special machine-tool controls and other types when needed on a rush basis.

Aluminum Seller Opens Branch

Aluminum Limited Sales Inc., New York, United States distributor for Aluminum Co. of Canada, Montreal, Que., opened a branch office at 2842 W. Grand Blvd., Detroit. The branch office is headed by Leo Reierstad.

Blackstone Corp. Buys Swanson

Blackstone Corp., Jamestown, N. Y., purchased Swanson Machine Corp., that city. Possession will be taken around Nov. 1, says L. E. Swanson, president of the latter firm.

Lithium Output To Increase

Lithium Corp. of America Inc., Minneapolis, consummated an agreement with Quebec Lithium Corp., a subsidiary of Sullivan Consolidated Mines Ltd., Montreal, Que., which will result in greatly increased production of lithium. Quebec Lithium owns an important ore body in the province of Quebec and plans to build a concentrating plant to produce ore concentrates. The agreement provides that Lithium Corp. of America will process the entire output of this concentrating mill at its chemical plants at St. Louis Park, Minn., and Bessemer City, N. C. This will enable Lithium Corp. to about double the output of its plants. This move, coupled with the firm's announcement several months ago of its plans to erect a $7-million plant at Bessemer City, will satisfy present demands for lithium.

In another move, Lithium Corp. increased its interest to 100 per cent in the Cat Lake, Man., properties formerly owned by Northern Chemicals Ltd. At the present time, there are no mining and recovery activities at this location, although some diamond drilling and surface trenching has been completed.

American Can To Expand

American Can Co., New York, will double the capacity of its St. Paul plant. The expansion project, which will bring the factory's rated capacity to well over 700 million cans a year, is expected to be completed by next spring. New equipment will include several high-speed lines for the manufacture of beer and food cans, as well as presses and baking ovens for the coating and lithographing of metal containers.

Starts Work on Long Bridge

American Bridge Division, United States Steel Corp., Pittsburgh, is erecting the steel superstructure for a natural gas pipeline suspension bridge across the Mississippi river at Grand Tower, Ill. The 3690-ft bridge with a main span of 2150 ft (claimed to be the longest in the world) is being built for Texas Illinois Natural Gas Pipeline Co., Chicago, at a cost of $3.8 million. Two 30-in. pipelines will be laid from two steel framework towers, one on each side of the river. Some 1300 tons of structural steel and wire rope will be used. The pipe alone weighs in excess of 563,000 lb. The steel is being fabricated at the Gary, Ind., plant of American Bridge while the wire rope comes from U. S. Steel's American Steel & Wire Division plant in Trenton, N. J.

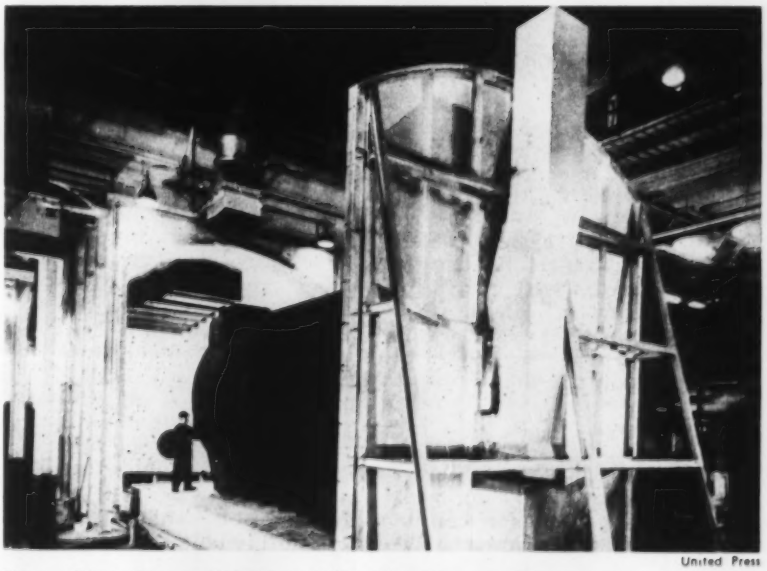
The division also announces that it is marketing all-steel swimming pools in a range of four sizes. They are constructed of corrosion and rust-resistant copper-bearing steel.

Rheem Forms New Department

Rheem Mfg. Co. is developing a department at its Sparrow Point, Md., plant for the glass-lining of domestic water heater tanks. This will be in addition to the copper and hot-dip galvanized types which the plant has been producing.

Metalphoto Offers New Item

Metalphoto Corp., Cleveland, was granted complete rights to manufacture and sell photosensitive, anodized aluminum sheets, designed for photographic reproduction. The product, originally



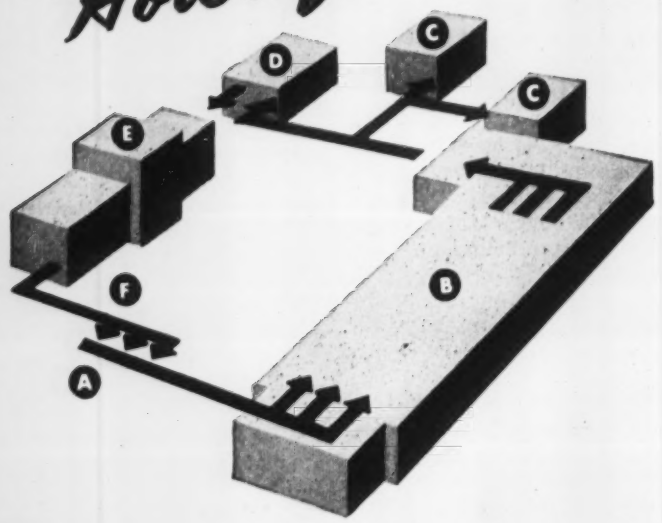
United Press

King-Size Oven "Bakes" Westinghouse Generators

Frames for giant electric power turbogenerators are literally "baked" for days in this furnace in the generator manufacturing aisle at Westinghouse Electric Corp.'s East Pittsburgh, Pa., plant. The furnace has usable interior space 30 ft long, 18 ft wide and 16 ft high. The 150,000-pound turbogenerator shown above is being prepared for a three-day heat treatment at about 1175° F. Even heating in all parts of the furnace is assured through use of special controls and ducts. Some 85,000 refractory bricks were used in constructing the furnace

Heat Treat Furnace Layout

by *Holcroft* ...8th of a Series



A Load
B 3-row Carburizing Furnace
C Press Quench Machines
D Quench Tank
E Both parts feed through single row draw furnace
F Unload

1 Furnace Layout Handles 2 Parts
Saves time, man hours; cuts costs

Design experience paid off in this east coast plant. With two parts involved—both receiving the same heat treating cycle, but one requiring press quenching and the other selective hardening—the obvious answer seemed to be two separate layouts.

When given the problem, Holcroft engineers decided one layout would do. The work—drive gears and pinions—is now carburized in a 3-row pusher type furnace. After leaving the carburizing furnace the pinions are quenched by the tray load while the drive gears are individually press quenched and reloaded on trays. Both parts then continue on through the single-row draw furnace.

The results: substantial savings in both time and man-power.

Unusual? Not at all. Just another example of how experience and "know-how" pays off in time, money and job satisfaction.

Write today for complete information. Holcroft & Company, 6545 Epworth Blvd., Detroit 10, Michigan.

PRODUCTION HEAT TREAT FURNACES FOR EVERY PURPOSE

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CANADA
Walker Metal Products, Ltd.
Windsor, Ontario

EUROPE
S. O. F. L. M.
Paris 8, France

developed by Horizons Inc., Cleveland, involves the use of aluminum sheets which measure 0.02 in. in thickness. The product is used in making such products as name plates, dial and watch faces, wiring diagrams, instructions, instrument and slide rule scales.

Testing Firm Widens Facilities

Consolidated Testing Laboratory Inc., West Hempstead, N. Y., affiliated with Industrial X-Ray Inc. and Able Laboratory Inc., recently opened its facilities for all phases of metallurgical, chemical and spectrochemical testing. A. J. Mitteldorf is director of the laboratory; D. O. Landon, chief chemist.

Buys Sonsel Refractories Corp.

International Minerals & Chemical Corp., Chicago, acquired Sonsel Refractories Corp., Brighton, Mich. Louis Ware, president of International, says the Sonsel plant will expand production of zirconium refractories under a patent process and other special refractories.

Titanium Dioxide Capacity Up

Facilities for production of titanium dioxide are being expanded rapidly. The latest projects have been announced by National Lead Co., New York, and Glidden Co., Cleveland.

One of the largest titanium dioxide and sulphuric acid plants in the world will be built in Baltimore by Glidden. First unit of the huge plant, which alone will cost $10 million and cover some 25 acres, is scheduled to be completed by December, 1955. Ultimately, three units will occupy the 100-acre site. G. M. Halsey, director of manufacturing for Glidden's Chemicals, Pigments & Metals Division, will be in complete charge of planning and construction of the facilities.

National Lead is constructing new facilities for the production of titanium dioxide at St. Louis. The additional capacity, about 36,000 tons a year as TiO_2, will be added on top of expansions three years ago at both the Sayreville, N. J., and St. Louis titanium pigment plants of the company. It is expected that the new production will

measuring up

...and REX is the standard by which all high speed steels are compared

An older brother sometimes makes a handy yardstick for measuring junior's growth. And when it comes to tool steels, REX® High Speed Steel is — and has been for over 50 years — the standard of comparison.

There's no mystery to REX High Speed Steel. Its quality has been time-tested in thousands of shops. And after all, it's performance — not claims — that really counts. Make your *own* comparison test. Put REX High Speed Steel to work. Compare its structure, finish, hardenability, carbide distribution and general uniformity. You won't find another high speed steel that surpasses REX.

Remember, too, that even though it is widely distributed and used, REX High Speed Steel is made *only* by Crucible. So for tops in high speed steel performance, be sure you order the Crucible REX brand.

CRUCIBLE first name in special purpose steels

54 years of Fine steelmaking **TOOL STEELS**

CRUCIBLE STEEL COMPANY OF AMERICA · TOOL STEEL SALES · SYRACUSE, N. Y.

begin in July, 1955, with the facilities in full operation by the end of the year. National Lead owns extensive reserves of ilmenite, the mineral which serves as a raw material for the production of titanium pigment.

Ford Expands on West Coast

Ford Motor Co., Dearborn, Mich., has launched a $500,000 program to improve production facilities at the Los Angeles assembly plant of Lincoln-Mercury Division. The program, scheduled to be completed next spring, includes a 70,000-sq-ft addition to the main assembly building, construction of a smaller prefabricated steel building to house tire and wheel painting and assembly operations, a large new loading dock and numerous miscellaneous improvements to plant facilities. This expansion is part of a $13-million development program of Lincoln-Mercury Division.

Ford Motor Co.'s Tractor & Implement Division, Birmingham, Mich., established a major engineering center in that city for tractors and farm equipment. The harvesting engineering activity of Wood Bros. Inc., Des Moines, Iowa, also will be transferred to Birmingham.

Globe Corp. Changes Name

Globe Corp., Chicago, changed its corporate name to George Getz Corp. Operating divisions include: Woodmanse Mfg. Co., Freeport, Ill., water systems; Modern Water Equipment Co., West Chicago, Ill., water softeners and heaters; Raylee Engineering Inc., West Chicago, Ill., water valves; Fabriform Metal Products, Los Angeles, copper furnace brazing.

May Develop Iron Ore Deposit

Battelle Memorial Institute, Columbus, O., has been retained by Fenimore Iron Mines Ltd., Toronto, Ont., to estimate the probable cost of an initial plant at Ungava bay on the north Atlantic coast, capable of producing 1 million tons of iron concentrates annually. Battelle also will determine the concentration characteristics of the ore in Fenimore's North Finger lake deposit close to tidewater. Of an estimated 1 billion tons of iron-bearing material on Fenimore's two concessions in the Ungava area of northern Quebec, about 200 million tons, mineable by open-pit methods, are stated to be in the North Finger lake area. The deposit, reported to average 30 per cent iron, is a mixture of magnetite, hematite and gangue.

Rust Awarded Furnace Contract

Rust Furnace Co., Pittsburgh, is constructing a new billet heating furnace for U. S. Steel Corp.'s American Steel & Wire Division, Cleveland. The furnace will serve a new rod mill at the division's Cuyahoga Works, that city. It will have a capacity of 100 tons per hour and is expected to be placed in operation next spring.

Olin Mathieson Chemical Corp.

Olin Mathieson Chemical Corp. is the name of the company to be formed by merger of Olin Industries Inc., East Alton, Ill., and Mathieson Chemical Corp., Baltimore. The company will be one of the nation's important diversified processing and manufacturing enterprises with total assets of about $500 million. Products will include nonferrous alloys and fabricated metal parts, powder-actuated tools and fasteners, electrical products, chemicals, sporting firearms and ammunition, industrial explosives and insecticides.

Westinghouse Opens Plant

First carload shipment of welding electrodes left Westinghouse Electric Corp.'s new manufacturing plant near Montevallo, Ala., on July 15. The shipments follow by less than a month the final phases of installing equipment in the plant, located about 35 miles south of Birmingham. "This plant will be capable of producing welding electrodes by the millions of pounds a month," says R. E. Ballentine, plant manager. Brazing alloys also are manufactured at the plant.

"KRANE KAR
SAVED US $3824.24
IN 8 MONTHS,"
Says V. James DeNaples,
TECHNICAL SERVICES FOREMAN,
NORMA-HOFFMANN
BEARINGS CORP.
"THIS VERSATILE YARD CRANE simplifies our materials-handling," says Mr. DeNaples, "cuts operations and travel trips, saves us a considerable amount of work and time. Our KRANE KAR speeds unloading of incoming materials . . . transports and stacks them at storage . . . loads them on floor trucks for delivery inside (long shafts of tubing, stacked bearing ring forgings, 800 and 1000 lb. coils of steel strip). Also loads outgoing scrap and waste drums on trucks and gondolas; tows sludge wagon from grinding waste chute to waste dump, up-ends it, tows it back." Monthly net savings—$478.031 Ask for Bulletin No. 89.
Gas or diesel, 9 to 37 ft. booms or adjustable telescopic booms; pneumatic or solid rubber tires; electric magnet, clamshell bucket and other accessories.
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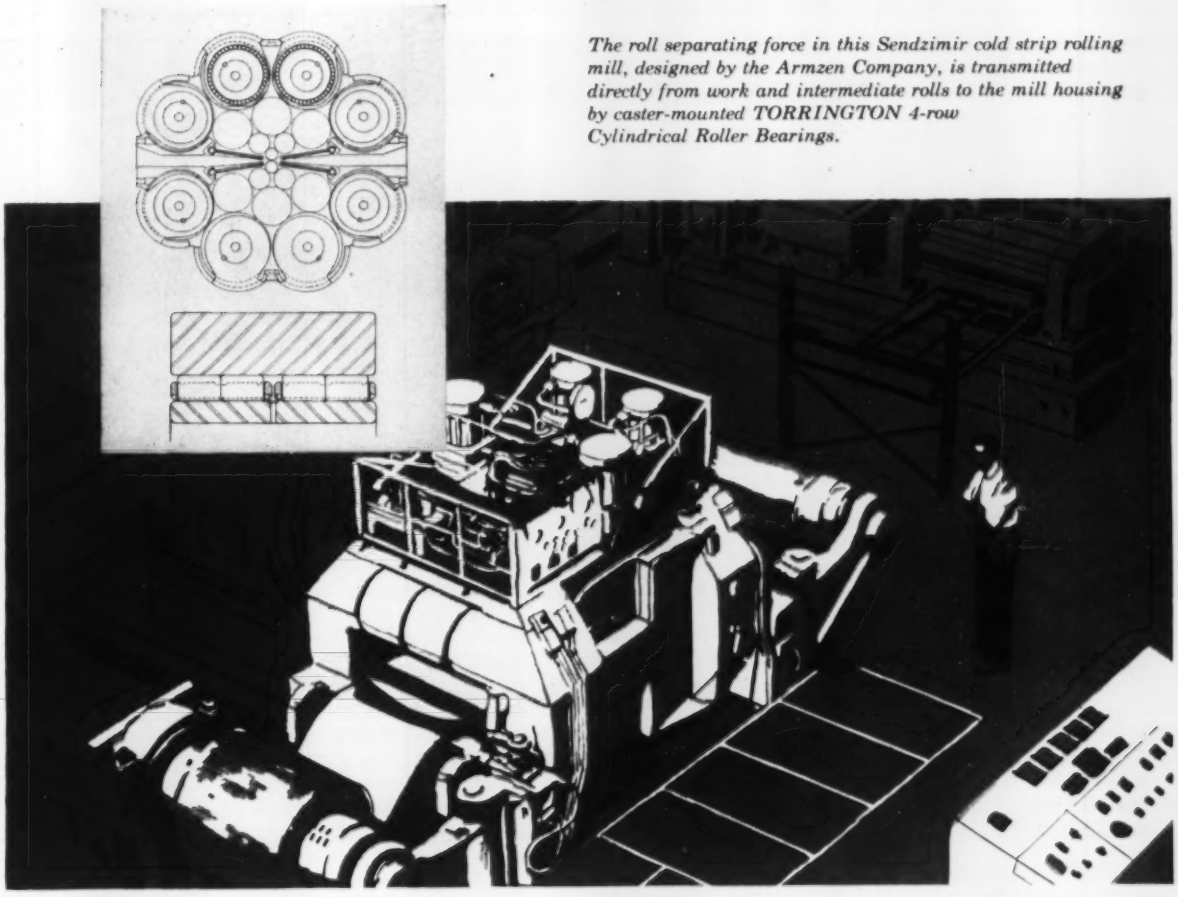

The roll separating force in this Sendzimir cold strip rolling mill, designed by the Armzen Company, is transmitted directly from work and intermediate rolls to the mill housing by caster-mounted TORRINGTON 4-row Cylindrical Roller Bearings.

Tissue thin strip to finest tolerances!

Fine gage cold-rolled strip accurate to tolerances of one to two ten-thousandths; that's the kind of precision work TORRINGTON Cylindrical Roller Bearings can produce.

Small diameter work rolls, plus a unique roll-backing principle giving minimum distortion, make the accuracy of this mill possible.

The TORRINGTON Bearings provide rigid backing for the intermediate rolls by utilizing outer races of especially heavy section, and four rows of precision-ground rollers in machined bronze cages for positive roller guidance.

This is an example of Torrington's ability to engineer anti-friction bearings to meet special requirements. TORRINGTON Bearings are available in a complete range of types to handle any combination of radial and thrust loads. To assure minimum friction, high capacity and long life, specify TORRINGTON Bearings.

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...but there's a big difference underneath

And it's the same way in buying carbon or alloy steel tubing. Lots of it looks very much like OSTUCO . . . but underneath it all there are these advantages that save you money:

OSTUCO provides a single source service . . . complete manufacturing, fabricating and forging operations under one roof mean one purchase order takes care of all details. And you can depend on deliveries as promised. OSTUCO'S flexibility assures the same efficiency and economy in both large or small production runs. OSTUCO'S quality control maintains uniformity of structure from raw materials to finished product.

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117 Liberty Street, New York 6, New York

STEEL

August 9, 1954

Technical Outlook

ANOTHER HAT IN THE RING— We're getting into vacuum melted high temperature alloys with a new one that will stand higher temperatures than other wrought alloys now in production says Carboloy Dept. of General Electric, Detroit. Stress rupture properties of the new alloy are said to be better than for M-252 and S-816; initial production will be in a 400 pound vacuum furnace which will turn out 100,000 pounds yearly. For the near future: Alloys of nickel or cobalt-chromium base hardened with molybdenum, tungsten, carbon, titanium and aluminum to stand 1600°F and over.

ON THE LIGHTER SIDE— Kaiser has just lifted the wraps on their new high strength non-heat treatable aluminum alloy, K186. They say it was developed specifically to extend the use of aluminum to applications where heat treatable alloys are too costly or inadequate in physical or mechanical properties. Composition: 4 per cent magnesium, 0.45 manganese and 0.10 chromium. Recommended uses: Unfired pressure vessels, structural towers, welded boat hulls, rocket motor tubing, guided missile containers, trusses and girders, truck and trailer frames, tanks, pipelines and scaffolding.

PLASTICS PROGRESS— Foundry core boxes and patterns are among the newer applications of epon resin formulations. Pattern life compares favorably with aluminum and other pattern materials while original cost is about one-third. Pattern delivery time is reduced by 75 per cent.

STUDY WELDING STATIC—Radio interference caused by arc welding machines is a step closer to being under control. The FCC has given the Joint Industry Committee until July 31, 1955, to determine practical limits to which radio-frequency-stabilized welders can be designed. Until then permissible limits established Sept. 1, 1952, will be enforced—10 microvolts per meter at one mile distance. Equipment produced prior to Sept. 1, 1952, will continue to operate under the provision that they shall cause no harmful interference to authorized radio service.

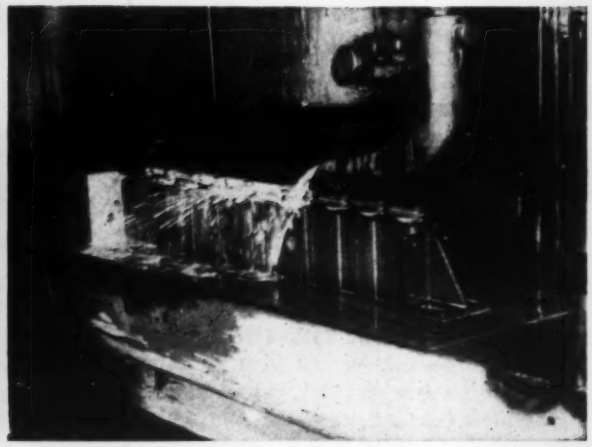
DISTINCTION— The little known metal, rhenium, is said to work harden more than any other pure metal. Other properties; A high modulus of elasticity (67 million psi) and the second highest melting point among metals (3180° C). First uses are expected to be in electrical and electronic equipment. It is 600 times more resistant to the "water-cycle" test than tungsten.

TRACE ANALYSIS— We have developed a quantitative method that finds rare earth residuals in steels as low as 0.005 per cent, say chemists at Mallinckrodt Chemical Works, St. Louis. They use a spectrographic DC arc, following electrochemical and chemical operations.

"HOT" HEAT EXCHANGERS—Two new design heat exchangers involving less expensive materials and fewer complex shop operations than previous units are to be built by Babcock & Wilcox Co. for the first full-scale nuclear power plant in the U.S. B & W is subcontractor of Westinghouse Electric Corp. which holds responsibility for the nuclear portion of the project.

GROWING— General Electric expects the use of shell mold resins will exceed the 25-million-pound mark yearly by 1957. Over 8 million pounds were consumed last year. One of the problems the company will concentrate on in its new experimental foundry is casting of low carbon steel in shell molds.

Offhand grinding with a 180-grit, 50 per cent concentration diamond wheel. Adequate supply of coolant is a must



Carbide blocks are surface ground in steel fixtures. A babbit-like material, poured in, holds them in place

Step Up Efficiency

in Carbide Grinding

From the cost angle alone, carbide grinding must be streamlined. A possible future shortage of diamonds is the clincher —examine and evaluate all processes

By F. J. LENNON
General Superintendent
Kennametal Inc.
Latrobe, Pa.

CARBIDE manufacturers are continuing to expand production operations, providing carbide for more applications in greater quantities. The demand for diamond grinding is growing in proportion.

Now, however, there's cause for concern over the supply of industrial diamonds. Indications are that we have reached, or are about to reach, the peak of the diamond supply. Certainly, we soon will have a greater demand for these industrial gems than our supply will handle.

Challenge — Production men involved in grinding carbides should give careful consideration to the proper use of diamond wheels to make the supply go as far as possible. Also, they should consider, and perhaps should be experimenting with, one or more of the substitute methods as insurance against the time when they may have to use them.

Definition—It must be recognized that carbide grinding today is a complex subject, involving a great variety of operations, grinding wheels and machines. In referring to this subject, we mean more than just the grinding of single point tools. This operation is no longer the chief consumer of industrial diamonds.

Based on our experience at the Kennametal plant, we have drawn conclusions about proper wheel selection for several carbide grinding operations.

Offhand Grinding

Here we use a plain cup type wheel (style D6WHC). Our wheel spec calls for 180-grit vitrified bond, 50 per cent concentration. The 180-grit is used on 6-inch wheels to obtain required quality cutting edges. On the 10-inch diameter wheel, 150 grit gives a satisfactory edge.

Surface Grinding

Where surface grinding is being done on work that requires a cutting edge, either a 180 or 220-grit wheel should be used. Occasionally fine edges equivalent to a lapped edge may require a 400-grit wheel. For general purpose work such as grinding of wear parts, anything from 60 to 220-grit can be used, depending on the work specifications. In all surface grinding operations, the resinoid bond wheel with 100 per cent concentration has been found to be the most satisfactory. Careful tests should be made on wheels with other type bonds before using them extensively.

Cylinder Grinding

Here a variety of wheel diameters can be used, up to 24-inch. Regardless of wheel size, a resinoid bond with 100 per cent concentration has been found to be most economical. Again, the grit size will vary from 100 to 400, depending on the job.

Centerless Grinding

Our centerless work on carbides is done on a No. 2 Cincinnati machine, using 16-inch diameter wheels with a 2-inch face. Wheels are 100-grit, 50 per cent concentration and are resinoid bonded.

Internal Grinding

For internal grinding we recommend a resinoid bond wheel with 100 per cent concentration and with 100 grit. Here we have successfully applied vitrified bond wheels on some jobs. A check may

prove them more economical than resinoid bond for specific jobs. Most metal bond wheels have too slow a cutting action for off-hand production grinding, but there are a few on the market that show considerable improvement, and they should be given consideration.

Choices — What determines whether to use resinoid, vitrified or metal bond wheels for off-hand grinding?

The resinoid wheel is the fastest grinding wheel of the group. It also is the most expensive to use, since it wears rapidly. The metal bond wheel will last longer but its cutting action generally is considered quite slow. The vitrified bond wheel seems to strike a happy medium.

Operating conditions determine the wheel to use. Where there's a production problem, resinoid or vitrified bond wheels are probably the answer. If the main objective is wheel life, then it will probably be more economical to stay with the metal bond wheel.

Grit Size—Use the coarsest grit that will give a satisfactory finish. This will depend on the job and the specifications involved.

If specifications call for a 10-microinch finish or coarser, then a 100-grit diamond wheel will be satisfactory. If a 6 to 8-microinch finish is required, the 220-grit wheel will be necessary. For 4 to 50 microinches, a 400-grit wheel will have to be used. For finer surface finishes than this, lapping and polishing operations are usually required. Finishes as low as 1 to 2 microinches are frequently specified and readily obtained.

Coolant—Use of the proper coolant is extremely important to diamond wheel life. Actual tests indicate that diamond wheel life can be doubled by going to a proper coolant. Tests may be necessary to determine the right fluid for your job.

One recommendation on the use of coolant: Use a lot of it. Lack of coolant or dry grinding seriously affects the diamond wheel life.

Another Wheel—Silicon carbide wheels must be given consideration in grinding carbide tools and parts, particularly on roughing operations. If you are doing carbide grinding on large machines, removing considerable volume of carbide, or grinding a large area of carbide, diamond grinding will be more accurate and more economical than silicon carbide grinding.

However, if the volume of carbide to be ground is small, silicon carbide grinding may be more economical than diamond grinding. Here, again, a test on both methods is necessary. Where silicon carbide wheels are used, it frequently is found that it's cheaper to use large wheels to minimize the effect of rapid wheel breakdown which is typical of silicon carbide grinding.

At our plant, rough grinding of single point tools is done with a 20-inch diameter silicon carbide wheel with a 1½-inch-wide face. Grinding is done on the periphery of the wheel rather than on the face. Where silicon carbide wheels can be used and where grinding can be done on the periphery of the wheel, there are advantages in applying coolant through the wheel.

Cost Factors—It is frequently overlooked by people designing tools that composite grinding has a tremendous effect on diamond wheel life; that is, grinding steel and carbide simultaneously. One estimate indicates that the ratio of diamond grinding wheel wear on composite grinding vs solid carbide grinding is as much as 7 to 1. Actual figures from our plant indicate 4 to 1 is closer, but it still points out the need for proper consideration of this factor when checking diamond grinding costs.

Proper wheel speed is important in obtaining maximum wheel life. A check on the grinding machines in many plants will indicate that some of them are not operating at the wheel speed recommended for diamond wheels (5500 sfm). Correcting this will usually give considerable improvement in wheel performance.

A LOOK AT SUBSTITUTE METHODS

ELECTROLYTIC GRINDING—Shows considerable promise . . . does conserve diamonds . . . only 1/6 as many diamonds may be required . . . removes stock satisfactorily and gives uniform, quality cutting edges . . . somewhat slower than conventional grinding . . . heavy flow of electrolyte material is somewhat objectionable from the operator's standpoint . . . initial cost of equipment is high

ULTRASONIC PROCESS—Process will be tested on a wider basis . . . evidence to date is inconclusive . . . may prove to be acceptable for specific grinding operations

ABRASIVE BELT FINISHING—Can be used for finishing the edges of single point carbide tools . . . a good edge can be produced by this method . . . if we face a shortage of diamond wheels, this could provide a good substitute method

ELECTRODISCHARGE PROCESS—Probably most advanced of the substitute methods, since its acceptance doesn't depend on supply of industrial diamonds . . . makes feasible operations in carbide machining that were not practical by any other method (drilling and tapping of small holes, forming intricate shapes, etc.) . . . acceptance and use will be limited to those who need this type work . . . greater utilization can be expected if it can be adapted to more conventional grinding operations

Tests of these methods have been under way at Kennametal for some time. Conclusions above are based, in part, on these tests.

Consumption and Supply of Diamond Bort and Cemented Carbide Production

(YEAR 1953 ESTIMATED)

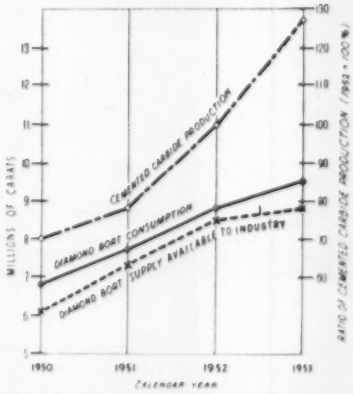
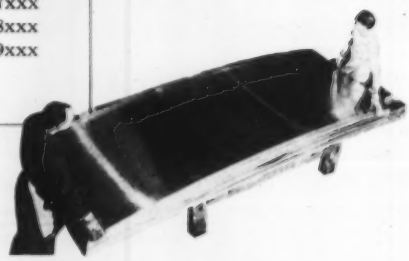


Chart indicates the widening gap between production and the availability and consumption of diamonds. Possible future shortage shows up in curves

Data from NPA, Kennametal and Carboloy.

NEW DESIGNATIONS FOR ALUMINUM ALLOYS

Aluminum—99.00% minimum and greater	1xxx
Major Alloying Element	
Aluminum Alloys grouped by major Alloying Elements:	
Copper	2xxx
Manganese	3xxx
Silicon	4xxx
Magnesium	5xxx
Magnesium and Silicon	6xxx
Zinc	7xxx
Other element	8xxx
Unused Series	9xxx



Aluminum Specs Are Standardized

New system of uniform alloy designations will clear up confusion from special numbers. Basis is four-digit number, last two digits of which are same as old number

BEFORE LONG you can order your aluminum by the same alloy number from all suppliers.

A new system of uniform alloy designations (effective October 1) for wrought aluminum and aluminum alloys has been developed by the Aluminum Association. It will clear up confusion stemming from special designations used by producers, technical groups, and government agencies.

Four Digits — The new system uses a four digit number. Here's how it works: The first digit shows the general group to which an alloy belongs. Second digit signifies any modifications of this alloy or changes in impurity limits. The last two digits are to identify the alloy.

To aid in the transition from old designations to the new system in most cases the old numbers are retained as the last two digits of the new numbers. Example: Alloy 3S becomes 3003; 24S is 2024; and 61S is 6061.

Pure—The 1xxx series designates aluminum with minimum purities of 99.00 per cent and higher. In this series the last two digits show the minimum aluminum percentage. These digits are the same as the two digits to the right of the decimal point in the minimum aluminum content when it is expressed to the nearest 0.01 per cent.

The second digit specifies any modifications in the impurity limits. If the second digit is zero, then there is no special control on individual impurities. Digits 1 through 9, used consecutively, show special control of one or more impurities.

For instance, 1030 is 99.30 per cent minimum aluminum without special control of individual impurities; 1130, 1230, 1330, etc., have the same over-all purity with special control of 1, 2 and 3 impurities.

Alloys — Series 2xxx through 8xxx designate aluminum in which major alloying elements are: Copper 2xxx; manganese 3xxx; silicon 4xxx; magnesium 5xxx; magnesium and silicon 6xxx; zinc 7xxx. Series 8xxx is used for major alloying elements other than the above. The 9xxx series is reserved for additional designation that may be needed in the future.

The last two digits identify the different alloys in the group. They are the same as those formerly used to name the alloy. This means that 2014 is 14S; 3003 is 3S; 7075 is 75S.

For new alloys in a series, the last two digits will be assigned consecutively beginning with xx01.

Letters Go—The second digit in the 2xxx-8xxx series indicates a modification of the alloy and replaces letters that have been used in the past. Alloy 17S becomes 2017, and A17S is 2117. Alloy 18S become 2018, and B18S is 2218.

Experimental alloys will carry the prefix "X" (same as now) which will be dropped when they become standard.

The temper designation system will stay the same. Temper designation follows the alloy designation and is separated from it by a dash. 3S-0 is 3003-0; Alclad 24S-T81 is Alclad 2024-T81, and 75S-T6 is 7075-T6 707.

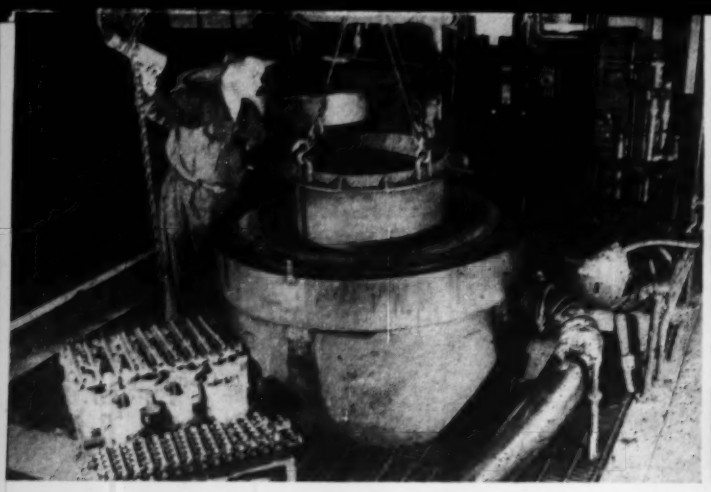
CHEMICAL COMPOSITION LIMITS FOR WROUGHT ALUMINUM ALLOYS

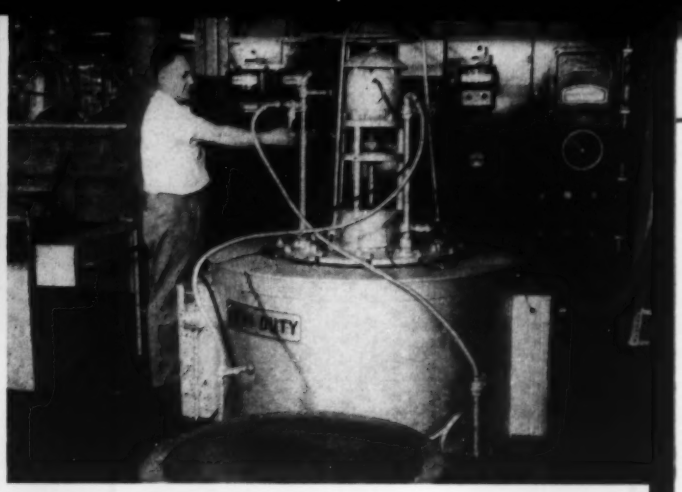
Per cent maximum unless shown as a range

New Designation	Old Designation	Silicon	Iron	Copper	Manganese	Magnesium	Chromium	Nickel	Zinc	Titanium	Others Each	Others Total	Aluminum Min.
1030	A E 1 S												99.30
1050	A D 1 S												99.50
1060	B D 1 S												99.60
1070	A C 1 S												99.70
1075	J C 1 S												99.75
1080	B C 1 S												99.80
1085	A B 1 S												99.85
1090	F B 1 S												99.90
1095	A A 1 S												99.95
1099	B A 1 S												99.99
1100	2 S	1.0 Si +	Fe	0.20	0.05				0.10		0.05	0.15	99.00
1130(1)	R-308(1)	0.7 Si +	Fe	0.20							0.05	0.15	99.30
1145(2)	B E 1 S	0.55 Si +	Fe	0.05	0.05						0.03		99.45
1150(3)	E D 1 S												99.50
1160	C D 1 S, 99.6	0.40 Si +	Fe	0.05							0.05	0.15	99.60
1175(4)	99.75	0.15 Si +	Fe	0.10							0.02		99.75
1180(5)	C C 1 S, R998	0.09	0.10	0.03							0.02		99.80
1187(5)	E B 1 S, 99.87	0.06	0.06								0.01		99.87
1197(5)	C A 1 S	0.006	0.006	0.006		0.006			0.006		0.002	0.01	99.97
1230(6)	99.3	0.7 Si +	Fe	0.10	0.05				0.10		0.05	0.15	99.30
1235(2)	R 995	0.65 Si +	Fe	0.05							0.05	0.15	99.35
2011	1 1 S	0.40	0.7	5.0–6.0					0.30		0.05(7)	0.15	Remainder
2014	14S, R301 Core	0.50–1.2	1.0	3.9–5.0	0.40–1.2	0.20–0.8	0.10		0.25	0.15	0.05	0.15	Remainder
2017	1 7 S	0.8	1.0	3.5–4.5	0.40–1.0	0.20–0.8	0.10		0.25		0.05	0.15	Remainder
2018	1 8 S	0.9	1.0	3.5–4.5	0.20	0.45–0.9	0.10	1.7–2.3	0.25		0.05	0.15	Remainder
2024	2 4 S	0.50	0.50	3.8–4.9	0.30–0.9	1.2 –1.8	0.10		0.25		0.05	0.15	Remainder
2025	2 5 S	0.50–1.2	1.0	3.9–5.0	0.40–1.2	0.05	0.10		0.25	0.15	0.05	0.15	Remainder
2117	A 1 7 S	0.8	1.0	2.2–3.0	0.20	0.20–0.50	0.10		0.25		0.05	0.15	Remainder
X2214	XB 1 4 S	0.50–1.2	0.25	3.9–5.0	0.40–1.2	0.20–0.8	0.10		0.25	0.15	0.05	0.15	Remainder
2218	B 1 8 S	0.9	1.0	3.5–4.5	0.20	1.2 –1.8	0.10	1.7–2.3	0.25		0.05	0.15	Remainder
2225	B 2 5 S	0.50–1.2	0.30	3.9–5.0	0.40–1.2	0.05	0.10		0.25	0.15	0.05	0.15	Remainder
X2316	XC 1 6 S												
2618	F 1 8 S												
3003	3 S	0.6	0.7	0.20	1.0–1.5				0.10		0.05	0.15	Remainder
3004	4 S	0.30	0.7	0.20	1.0–1.5	0.8 –1.3			0.10		0.05	0.15	Remainder
X3005	X A 5 S												
4032	3 2 S	11.0–13.5	1.0	0.50–1.3		0.8 –1.3	0.10	0.50–1.3	0.25		0.05	0.15	Remainder
4043	4 3 S, K145	4.5– 6.0	0.8	0.30	0.05	0.05			0.10	0.20	0.05	0.15	Remainder
4045	4 5 S	9.0–11.0	0.8	0.30	0.05	0.05			0.10	0.20	0.05	0.15	Remainder
4343	C43S, 44S, K143	6.8– 8.2	0.8	0.25	0.10				0.20		0.05	0.15	Remainder
X4543	X E 4 3 S												
5005	A50S, R305, K155	0.40	0.7	0.20	0.20	0.50–1.1	0.10		0.25		0.05	0.15	Remainder
5050	5 0 S	0.40	0.7	0.20	0.10	1.0 –1.8	0.10		0.25		0.05	0.15	Remainder
5052	5 2 S	0.45 Si +	Fe	0.10	0.10	2.2 –2.8	0.15–0.35		0.20		0.05	0.15	Remainder
X5055	X 5 5 S	0.30	0.7	0.25	0.30–0.80	1.0 –5.0	0.25		0.25		0.05	0.15	
5056	5 6 S	0.30	0.40	0.10	0.05–0.20	4.5 –5.6	0.05–0.20		0.10		0.05	0.15	Remainder
5083	L K 1 8 3	0.40	0.40	0.10	0.50–1.0	4.0 –4.9	0.25		0.25	0.15	0.05	0.15	Remainder
5086	K 1 8 6	0.40	0.50	0.10	0.20–0.7	3.5 –4.5	0.25		0.25		0.05	0.15	Remainder
5154	A 5 4 S	0.45 Si +	Fe	0.10	0.10	3.1 –3.9	0.15–0.35		0.20	0.20	0.05	0.15	Remainder
5254	B 5 4 S	0.45 Si +	Fe	0.05	0.01	3.1 –3.9	0.15–0.35		0.20	0.05	0.05	0.15	Remainder
X5356	XC 5 6 S	0.50 Si +	Fe	0.10	0.05–0.20	4.5 –5.5	0.05–0.20		0.10	0.06–0.20	0.05(8)	0.15	Remainder
5357	C 5 7 S, K157	0.12	0.17	0.07	0.15–0.45	0.8 –1.2					0.05	0.15	Remainder
X5405	XD 5 0 S												
5652	F 5 2 S	0.40 Si +	Fe	0.05	0.01	2.2 –2.8	0.15–0.35		0.10		0.05	0.15	Remainder
6003(11)	R 3 0 6, K162	0.35–1.0	0.6	0.10	0.8	0.8 –1.5	0.35		0.20	0.10	0.05	0.15	Remainder
6053	5 3 S	(9)	0.35	0.10		1.1 –1.4	0.15–0.35		0.10		0.05	0.15	Remainder
6061	6 1 S	0.40–0.8	0.7	0.15–0.40	0.15	0.8 –1.2	0.15–0.35		0.25	0.15	0.05	0.15	Remainder
6062	6 2 S	0.40–0.8	0.7	0.15–0.40	0.15	0.8 –1.2	0.04–0.14		0.25	0.15	0.05	0.15	Remainder
6063	6 3 S	0.20–0.6	0.35	0.10	0.10	0.45–0.9	0.10		0.10	0.10	0.05	0.15	Remainder
6066	6 6 S												
6151	A 5 1 S	0.6 –1.2	1.0	0.35	0.20	0.45–0.8	0.15–0.35		0.25	0.15	0.05	0.15	Remainder
X6251	XB 5 1 S												
6253	B 5 3 S	(9)	0.50	0.10		1.0 –1.5	0.15–0.35		1.6–2.4		0.05	0.15	Remainder
X6453	XD 5 3 S												
6553	E 5 3 S												
6951	J 5 1 S, K160	0.20–0.50	0.8	0.15–0.40	0.10	0.40–0.8			0.20		0.05	0.15	Remainder
7070	7 0 S												
7072	7 2 S	0.7 Si +	Fe	0.10	0.10	0.10			0.8–1.3		0.05	0.15	Remainder
7075	7 5 S	0.50	0.7	1.2–2.0	0.30	2.1 –2.9	0.18–0.40		5.1–6.1	0.20	0.05	0.15	Remainder
X7178	XA 7 8 S	0.50	0.7	1.6–2.4	0.30	2.4 –3.1	0.18–0.40		6.3–7.3	0.20	0.05	0.15	Remainder
7277	B 7 7 S	0.50	0.7	0.8–1.7		1.7 –2.3	0.18–0.35		3.7–4.3	0.10	0.05	0.15	Remainder
8099	R 3 9 9												98.7
8112	K 1 1 2	1.0	1.0	0.40	0.6	0.7	0.20		1.0		0.05	0.15	Remainder
X8280	XB 8 0 S												
EC(10)	E C												99.45

(1) No. 1 Reflector sheet.
(2) Foil.
(3) Tubular conductors.
(4) Cladding on No. 2 Reflector sheet.
(5) Electrolytic condenser foil.
(6) Cladding on Alclad 2024.
(7) Also contains 0.20 to 0.60 per cent each of lead and bismuth.
(8) Also contains 0.0005 per cent maximum beryllium.
(9) 45 to 65 per cent of Mg content.
(10) Electrical conductor metal.
(11) Cladding on Alclad 2014.

The Aluminum Association





Left: Pump rotors and housings made of chrome-moly-aluminum steel are nitrided in this Leeds & Northrup setup at the DeLaval Steam Turbine plant, Trenton, N. J. Hardening is done at a relatively low temperature — 975°F. Quenching is unnecessary and distortion is negligible. Right: A vertical rotary furnace is used at Hartford Machine Screw Co., Hartford, Conn., in nitriding stainless and other types of steels. The Floe process is used

No. 7 in STEEL's
MODERN HEAT TREATING SERIES

Case Hardening Steel By Nitriding

Nitrides formed in the case give high hardness, wear, fatigue and galling resistance with minimum distortion. Hardness holds on at elevated temperature

NITRIDED PARTS have a combination of properties useful in engineering applications.

They are: 1. High surface hardness, even up to 1100°F; 2. good wear resistance, including metal to metal wear; 3. minimum tendency to seize or gall; 4. low warpage or distortion; 5. high fatigue resistance and reduced notch sensitivity.

Suitable steels are heated in contact with active nitrogen at 925 to 1100°F. Time runs anywhere from a few minutes up to 100 hours, depending on the steel and case depth.

Requirement—Steels for nitriding must have elements in solid solution that will form nitrides, such as aluminum, chromium, molybdenum, vanadium and tungsten. Properties of the precipitated alloy nitrides account for the hardened case.

Main applications are in aircraft parts where the payoff is the excellent combination of wear and fatigue resistance. Use is on the increase in other industries, textile, machine tool, diesels, turbines, trucks and buses.

Factors—One objection to nitriding is the need for alloy steel. But there are places where this doesn't hold up. Freedom from distortion and elimination of finishing operations after hardening may point the way to a lower over-all cost.

Wear resistance stems not only from high hardness of nitrided cases but also from their ability to retain hardness at temperatures where ordinary hardened steels soften. This gives resistance to seizing or galling and accounts for success of nitriding in places where nonlubricated or poorly lubricated conditions hold forth. Good frictional properties of a nitrided surface contribute here, too.

Negative Fatigue—Compressive stresses in nitrided cases give good fatigue behavior, particularly reduction in notch sensitivity. They counteract localized surface tensile stresses originating at imperfections; the tendency for such defects to initiate fatigue cracks is lessened.

Nitriding is not recommended for applications involving erosion or low stress scratching abrasion.

Most manufacturers put freedom from distortion in hardening close to the top of the list when looking at nitriding. Savings result from decreasing or eliminating grinding steps. If the two-stage method of nitriding is used, it is frequently possible to meet dimensional tolerances without any final grinding.

Here's How — In the two-stage process, normal nitriding practice is used with exception that treatment period is divided into two

TYPICAL STEELS SURFACE HARDENED BY NITRIDING

	Carbon	Manganese	Silicon	Chromium	Aluminum	Molybdenum	Vanadium	Others
Nitralloy 135 (Modified)	0.41	0.55	0.30	1.60	1.00	0.35		
Nitralloy 135 (Type G)	0.35	0.55	0.30	1.20	1.00	0.20		Nickel
Nitralloy N	0.23	0.55	0.30	1.15	1.00	0.25		3.5
Nitralloy EZ	0.35	0.80	0.30	1.25	1.05	0.20		Selenium
Nitricast Iron	2.75*	0.70	2.60	1.20	1.00	0.25	0.15	0.20
AISI 4140	0.40	0.90	0.30	0.95	...	0.20	...	
AISI X4340	0.40	0.70	0.30	0.80	...	0.25	...	
High Speed 18-4-1	0.70	...	...	4.00	...	...	1.00	Tungsten 18.00
High Carbon, High Chromium	1.50	...	...	11.50	...	0.80	0.20	
5% Chromium	1.00	...	...	5.00	...	1.15	0.40	

* 2.75 per cent total carbon, 1.90 per cent graphitic carbon

stages. First stage is carried out at 975°F with 20 per cent ammonia dissociation. Then the temperature is raised to 1050°F and the ammonia dissociation increased to 85 per cent.

Time at heat for each stage varies with case depth. Table I gives the recommendations of Dr. Carl F. Floe, Massachusetts Institute of Technology, for two-stage process.

Controls — Dissociation during the first stage may vary as much as ±5 per cent. In the second stage, it should be held within range of 83 to 86 per cent. Hourly checking is desirable.

About 30 cubic feet per hour of ammonia is required during the first stage. In second stage the atmosphere must be made up by mixing one part of raw ammonia and three parts of dissociated ammonia from an external dissociator. Parts should be cooled below 400°F in the nitriding atmosphere.

In addition to the grinding advantage, the two-stage process is superior to the single-stage method for another reason: Tendency to form brittle networks of iron nitride around the grain boundaries is less. As a result, cases are less apt to chip or pit, particularly where loading conditions are high.

Conventional—Standard practice in regular nitriding is to adjust the flow of ammonia to maintain 70 per cent ammonia and 30 per cent nitrogen plus hydrogen in the exhaust gas—in shop terms, "maintaining the ammonia dissociation at 30 per cent."

Per 100 sq ft of surface nitrided at 965 to 975°F, 20 to 30 cu ft (0.90 to 1.3 lb) of ammonia gas is consumed per hour, with dissociation at 30 per cent.

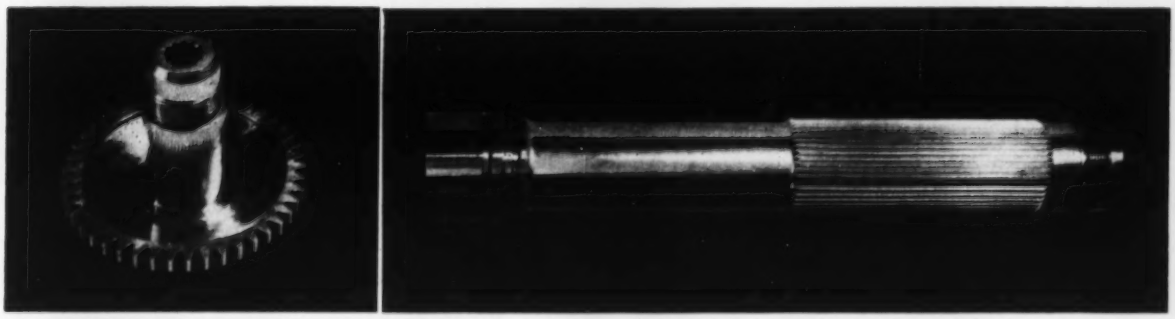
Checklist — Most important factors that set limits on hardness of a nitrided case: 1. Depth; 2. furnace temperature; 3. composition and structure of the steel.

The apparent surface hardness varies with case depth, but intrinsic hardness (measured by a microhardness test) of a shallow case is up to the level of that of a deeper case. Softer readings at the surface may be due to difficulty of measuring hardness of thin sections.

Case hardness goes down as nitriding temperature is increased, particularly in the 940 to 1000°F range. Some sacrifice in case depth vs time, of course, comes into the picture at lower temperatures.

Steels Used—Here we have the most important point, aside from temperature. Key: The amount and nature of the nitride forming elements.

Aluminum is the most effective hardening element; chromium ranks second. Vanadium and molybdenum are slightly less effective than chromium. Going over 2 per



Aircraft parts used in the Wright Turbo-Compound engine hardened by nitriding. Left: Tachometer and fuel pump drive gear. Right: Outer impeller drive shaft

TABLE I

TWO-STAGE FLOE PROCESS

	First Stage Time (Hours)	(975° F) Per cent Dissociation	Second Stage Time (Hours)	(1050° F) Per cent Dissociation
0.005-0.008	5	20	0	
0.008-0.012	5	20	5	85
0.011-0.015	5	20	20	85
0.013-0.018	6	20	26	85
0.017-0.022	8	20	42	85

cent for any of these elements does little to increase hardness.

Hardest cases to go along with good depth come from special steels containing aluminum, chromium and molybdenum. Chromium and molybdenum step up hardenability and increase resistance to tempering. Molybdenum also helps combat temper brittleness.

Examples—A widely used nitriding steel is Nitralloy 135 modified. Nitralloy 135 (Type G) has less chromium, molybdenum and carbon; likewise, case hardness is lower. Nitralloy N contains nickel for high core properties. AISI steel containing chromium and molybdenum, such as 4140 and X4340 are used. (See table for composition of nitriding steels.)

In Nitralloy and AISI steels, core properties are first developed by quenching from above the transformation range followed by tempering to the desired strength and hardness. Heat treatment to bring out the core properties may come after rough machining or may be done on bar stock. Core properties do not change during nitriding except for Nitralloy N, a special steel.

Exception — This "N" composition contains nickel, and at the nitriding temperature, precipitation hardening of the core takes place because of formation of a nickel-aluminum compound. This increases core strength and hardness.

In processing stainless, oxide on the surface must first be removed. This can be done by heating at 800 to 850°F for 2 to 4 hours in completely dissociated ammonia. Hydrogen does this job. Ammonia dissociation is then brought down to 30 per cent and the temperature raised to 1025 to 1050°F, the right range for stainless steels.

The Malcolmizing process (patented by V. T. Malcolm) uses active hydrogen gas formed by dissociation of ammonia to reduce oxides and passive film on stainless steels prior to nitriding. Average hardness of a Malcolmized case is close to 1000 Vickers (68-70 Rockwell C), according to Lindberg Steel Treating Co.

High speed tools, dies and gages are nitrided for hardness and wear resistance. Salt baths are suited to the short time cycles used here. Other die steels containing chromium and molybdenum are nitride-hardened for numerous applications.

A case having a hardness of 1000 Vickers-Brinell is produced on a special nitriding cast iron. Cylinder liners, bushings and pump rotors are typical parts. Graphite in the cast iron is beneficial for lubricating wear resistance.

Structure — In the regular nitriding steels, hardest and toughest cases are obtained with a sorbitic structure to start, which means that the carbide phase is uniformly distributed throughout the ferrite. If masses of free ferrite are in the steel, or if surface is decarburized, the case is brittle and tends to chip under hardness indentor. Such structures also increase the amount of growth which occurs in nitriding.

Growth—During nitriding, an increase in volume takes place in the case, forcing the rest of the part to stretch. This means that compressive stresses are present in the case and tensile stresses in the core.

For a given part and fixed nitriding cycle, the amount of growth is nearly constant. Then, it is only necessary to determine the dimensional changes experimentally and make proper allowances in finish machining dimensions before nitriding. If close dimensional stability is required, certain special precautions should be observed.

Growth takes place on all surfaces in nitriding and it combines at corners to form projections of high nitrogen content that are brittle and likely to chip. A good general rule is to avoid sharp corners or edges on parts.

Two Zones—Structure of a nitrided case consists of two distinct zones. In the outer zone, the nitride forming elements, including iron, are converted to nitrides. This region, which varies in thickness to a maximum of about 0.002 inch, is generally known as the white layer because of its appearance after a nital etch.

The depth of nitride case is set by the rate of diffusion of nitrogen from the white layer to the region beneath. Need during nitriding, then, is only for sufficient active nitrogen to maintain the white layer. If increased beyond this point, the depth of white layer is increased, but thickness of inner layer is not affected.

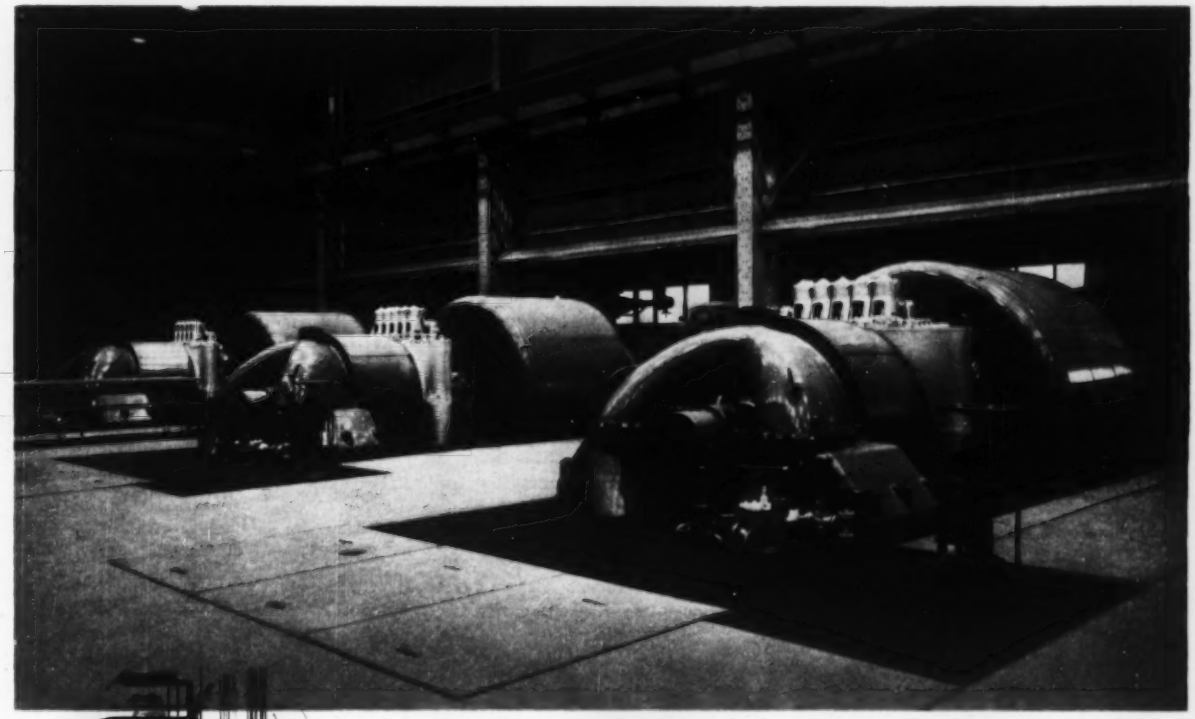
Degree of dissociation of ammonia fixes the concentration of active nitrogen on the surface of the steel, which in turn determines depth of the white layer. As has already been pointed out, in the older practice this dissociation is held at 30 per cent.

In the newer two-stage cycle, ammonia dissociation is first held at 20 per cent for periods of from 5 to 10 hours. During this period, the white layer is established and the useful nitride starts to form. In the second stage, the dissociation is increased to give a gas composition that is sufficient to just maintain a thin white layer. Final thickness of outer layer by this method is 0.0002 to 0.0004 inch.

Furnaces — Nitriding furnaces should maintain a uniform temperature within the container and must have provisions for adequate circulation of nitriding atmosphere. Proper gas circulation over all steel surfaces is essential to prevent ammonia from decomposing in dead zones in the container to the extent that nitriding is stopped in those regions.

Parts of this article are based on a chapter prepared by M. B. Bever and C. F. Floe, Massachusetts Institute of Technology, for *Surface Protection Against Wear and Corrosion*, to be published by American Society for Metals, Cleveland, O.

375,000 cfm
for U. S. Steel's Fairless Works



United States Steel's new Fairless Works at Fairless Hills adds another 2,200,000 ingot tons to America's steel-producing capacity. Its two blast furnaces have an annual capacity of 1,134,000 tons of iron—and its nine open hearth furnaces are capable of producing 2.2 million tons of steel per year. Also, rolling facilities are provided for cold rolled sheets, hot rolled sheets, steel pipe, merchant bars and tin mill products.

Over 45,000 hp of I-R Blowers supply ALL BLAST FURNACE AIR

In the photo above, you see the three, huge blast-furnace blowers at U. S. Steel's new Fairless Works. Each of these Ingersoll-Rand five-stage centrifugal compressors supplies 125,000 cfm against 35 psig, and is driven by a 15,750 hp I-R steam turbine. They will normally operate on 850 psi steam at 900°F.

The steam boilers in the power plant are supplied by five Ingersoll-Rand 8-stage CHTB boiler-feed pumps. Fifteen I-R gas jets mix air and natural gas to provide supplementary fuel of correct BTU value.

When it comes to steel mill blowing and associated power-plant equipment, it pays to take advantage of Ingersoll-Rand's specialized experience in this field.

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COMPRESSORS • AIR TOOLS • ROCK DRILLS • TURBO BLOWERS
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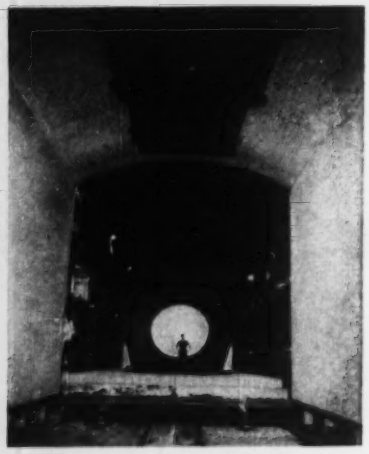
Car Type Furnace

CAR-TYPE heat treat furnace built by Westinghouse will be installed at the E. Pittsburgh works for stress-relieving large weldments. With a fully-usable charge space 18 feet wide and 16 feet high, single or multiple parts weighing up to 100 tons may be treated at one time.

The furnace was designed for maximum operating temperatures of 1600° F, but stress relieving will be performed at about 1175° F.

Front door, as well as the floor, rides on 20 car wheels on 20 parallel tracks.



STRESS-RELIEVING WELDMENTS . . . treats 100 tons at a time

Passing Air — The air passing through the combustion chamber is heated by gas and enters the furnace from the rear through ducts suspended from the ceiling.

To complete the cycle, air is drawn out of the furnace through two recirculating blowers having total circulating rate of 120,000 cfm. Ductwork then directs air flow upward to combustion chamber, and into the furnace chamber again. Each recirculating fan is powered by a 50-hp motor.

No Hot Spots—This method prevents hot spots within charge space and eliminates need for space above furnace door.

A program control is provided to automatically regulate cycle of heatup, soak and coolback to handling temperatures. Damper control admits outside air close to blowers to hasten cooling.

MACHINE TOPICS

BY R. F. HUBER, *Machine Tool Editor*

MACHINE TOOL SALES showed new life in June. They were the highest since October of last year.

In the latest monthly report from the National Machine Tool Builders' Association, (see STEEL, August 2, p. 48,) sales index for June were 186.8 as compared with 139.5 for May. Figures are based on a scale using 1945, 1946 and 1947 as 100.

Bubble in the business can't be traced to a particular source. There's some reason to believe that much of the additional activity took place in the special machine field, rather than with the standard, multipurpose machine producers. Beyond that, there's no sure indication.

While this boost in sales is nothing to shout about, it is encouraging. It may mean the sales have reached the bottom of their slide. Tell Berna, general manager of NMTBA, also points out that with sales as low as they have been lately, any buying program of consequence shows up handsomely on the general picture.

Backlog—In the same report, the machine tool backlog was set at about 3.6 months. While it's hard to pick an ideal backlog for the industry, if it's less than 4 months, it's nervous business.

Reason for this is that it takes more than 4 months to build many types of machine tools—to get the 4-month average, some builders are shipping from stock.

Dilemma — Getting the builders happy about backlog is a matter of mixed emotions. In the first place, anyone in management shoes is pleased when there are enough orders on the books to keep the company busy for a year or more.

On the other hand, business is lost when the order board is so healthy that a new buyer can't get what he considers reasonable delivery. As a compromise between these two divergent points, most builders would like to keep the backlog somewhere around 6 months.

Sees Good Future

T. H. Doan, president, Foote-Burt Co., Cleveland, says the rest of the third quarter looks good as far as his company is concerned. Active interest and inquiries now, for this special-machine builder, indicate a good level of orders for the next few months. Rumors of several programs, which will include special machine purchases, help to make the next few months look brighter. Foote-Burt's backlog now is about 9 months.

Acquisition

Pratt & Whitney, division Niles-Bement-Pond Co., West Hartford, Conn., announces that its subsidiary, Potter & Johnston Co., Pawtucket, R. I., has taken over the manufacture of products formerly made by Newark Gear Inc., Newark, N. J. The products include: Gear hobbing, gear cutting and gear testing machines as well as gear cutter grinding machines.

HERE in the McKee organization you'll find all the experience, technical knowledge and specialized skills needed to design, construct and equip your new plant . . . built to produce the results you want . . . and delivered on schedule.

But McKee engineering goes beyond this point. McKee proves results *first* . . . makes sure your new plant can produce up to specifications. And *then* we hand you the key . . . the key to a plant designed and built to earn a profit.

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Year's Use Proves Value of Betatron

Savings payed off the $350,000 cost before the 22-million volt machine had its first birthday. It teams up with other test methods to produce more conclusive results, too

By A. N. HAIG, Betatron Group AND H. B. NORRIS, Inspection Department
Allis-Chalmers Mfg. Co.
Milwaukee

Betatron provides means of inspecting deep welds, so simplified welded fabrication can be used on this grinding mill trunnion and head assembly

IN SEPTEMBER, 1952, a $350,000 industrial radiography laboratory with a 22-million volt betatron was put into operation by Allis-Chalmers Mfg. Co. at its West Allis plant. Less than one year later, a report to management stated that the entire cost of the laboratory had been amortized by savings resulting directly from its use.

Impressive as that may be, the company feels it is not as gratifying as the following manufacturing benefits obtained by use of the laboratory:

1. Superior quality control of critical components for high pressure, high temperature and heavy duty equipment.
2. Increased utility of other nondestructive testing methods through co-ordinated use with the betatron.
3. Early location of defects in castings and forgings.
4. Increased assurance of optimum foundry technique.
5. Weight reduction and simplification of large castings as well as greater use of weldments.

Critical Need—The installation answered a critical need for a means of proving the quality of important, thick-sectioned castings, forgings and weldments. A company-wide survey revealed that over one and one half million pounds of high temperature alloy steel castings would require comprehensive examination preferably by radiography. However, these castings, turbine cylinders, steam strainers and valve bodies all had section thicknesses much greater than the range of radiographic facilities available at that time.

Rotary valves, turbine runners, casing flanges and guides for hydraulic equipment, mill heads, crusher spiders and shells for processing machinery are other examples of components that presented the same problem.

Existing Equipment—Facilities at the time of the survey were a portable 200,000-volt x-ray machine and a 400,000-volt hoist-mounted unit. In addition, a 200-milligram radium pellet was available but used infrequently. Maximum thickness of iron or steel which can be examined for hidden flaws with this equipment is about three and one half inches. Exposure time for this thickness is about one hour with the 400,000-volt machine.

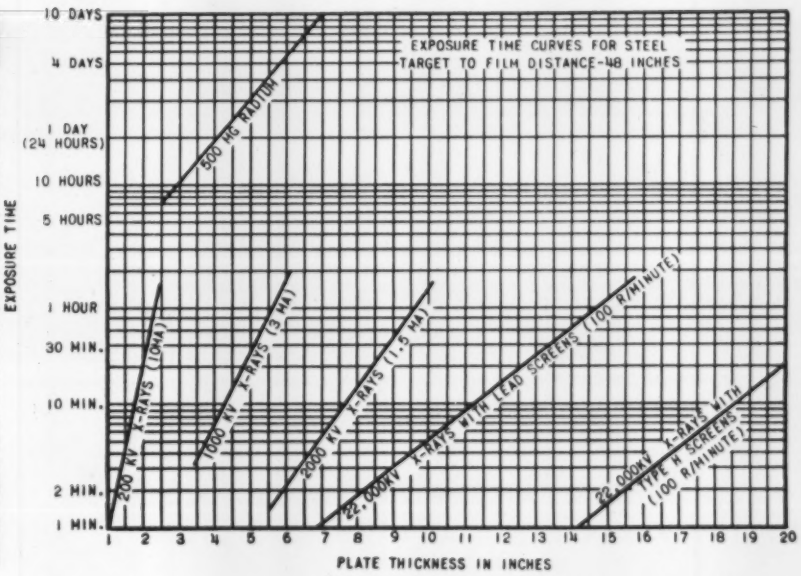
Analysis of work requiring radiographic examination beyond the range of these units showed that section thickness would generally range from 4 to 12 inches, frequently to 16 inches and occasionally much more. Therefore, facilities were required which would permit efficient inspection of sections up to 16 inches and with a range up to at least 22 inches.

Selection of Betatron—Consideration of radiographic means to satisfy all requirements of the company included investigation of resonant transformer and electrostatic equipment operating in the 1 to 2-million-volt range, as well as cobalt units and the 22-mv betatron. It finally centered on the betatron because the study revealed it to be the only unit that spans the range from 4 to 22 inches with adequate speed for handling the volume of work requiring inspection.

An early model, fixed position betatron had been used for radiography since 1948, but only to a limited extent because it required awkward time-consuming movement of the workpiece for each exposure. By 1951 the problems of crane-mounting a betatron without loss of stability and designing it for rotation in all three planes had been overcome, and plans for installation of such a unit were begun.

Efficient Laboratory—Efficient use of the unit required the construction of the laboratory, an "L"

With betatron inspection of rough steam turbine castings, flaws are located and repaired before machining begins. Part can be guaranteed sound


EXPOSURE TIME CURVES FOR STEEL
TARGET TO FILM DISTANCE-48 INCHES
EXPOSURE TIME
10 DAYS
4 DAYS
1 DAY (24 HOURS)
10 HOURS
5 HOURS
1 HOUR
30 MIN.
10 MIN.
2 MIN.
1 MIN.
500 MG RADIUM
200 KV X-RAYS (10MA)
1000 KV X-RAYS (3 MA)
2000 KV X-RAYS (1.5 MA)
22,000KV X-RAYS WITH LEAD SCREENS (100 R/MINUTE)
22,000KV TYPE M X-RAYS WITH SCREENS (100 R/MINUTE)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
PLATE THICKNESS IN INCHES

Time needed for x-raying steel shows advantage of betatron on thick sections

shaped building formed by a 40 by 60-foot x-ray bay, which contains the betatron, and a rail tunnel providing entrance to the bay. Auxiliary rooms, such as the control room, dark room and office, comprise the remainder of the building. Walls of the x-ray bay serve as radiation barriers and are of 6-foot reinforced concrete.

The betatron, suspended from a bridge crane by a telescoping tube assembly, can be moved over almost the entire floor of the bay and to a height of 20 feet above the floor. Work is moved and positioned with a 25-ton capacity bridge crane and is hauled into the laboratory from the shops by either rail or truck. By this arrangement work ranging up to 25 tons in weight, 20 feet in length and in a variety of shapes can be radiographed rapidly and efficiently. Heavier specimens can be radiographed right on the rail car.

Correlated System — Besides rounding out the company's nondestructive test system, the application of the betatron has also made it more effective. Each method is now confined to work for which it is best suited, and frequently the betatron is used with another method in a way that augments the usefulness of each.

The low voltage x-ray units are used for inspection of welds and light castings such as pump castings, for which their range is adequate for all except, possibly, bearing areas. In such cases the low voltage units are used on the thin sections and the betatron for the heavy sections, both with optimum efficiency. The betatron can also be used to radiograph the entire pump assembly for inspection of clearances and alignment of parts.

Ultrasonic Testing—The ultrasonic method is rapid, locates the depth of a defect, but does not identify the defect. Radiography reveals the defect's nature but does not show depth unless by special application. Consequently, using the two methods together makes an extremely useful team.

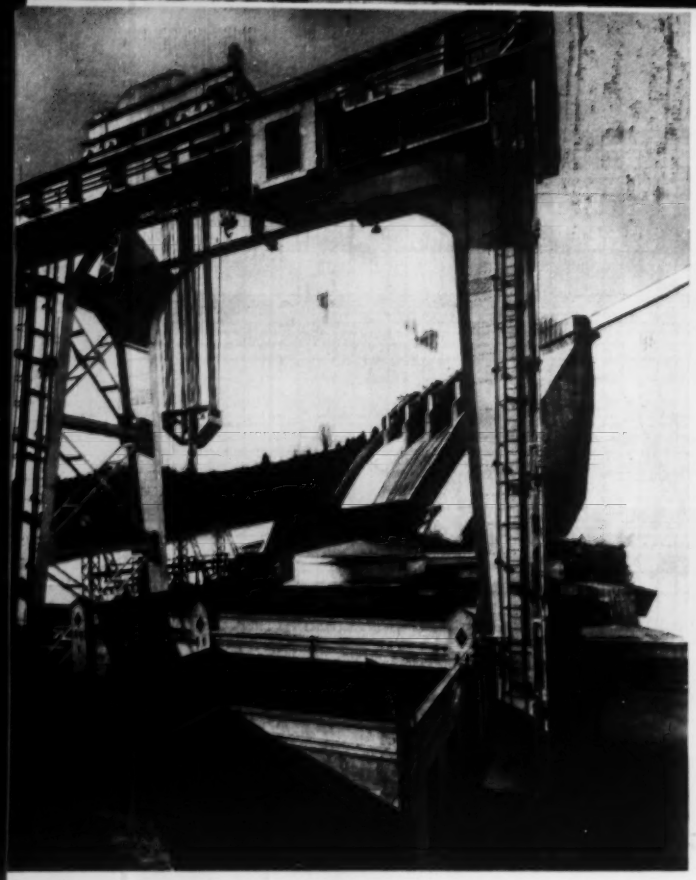
Standards for ultrasonic testing have been established by identifying sonic indications with radiographs of the defect causing the indication. Use of these standards has shortened inspection time for production runs of castings and forgings considerably. Much time has also been saved by using the sonic method to inspect castings and forgings and then using radiography to inspect areas giving sonic indications.

Early Location—A major portion of the savings realized from the application of the betatron is attributed to location and repair of defects before any machining work is done on the casting. A recent case illustrates this point.

Radiographs of a $30,000 casting revealed voids in one edge serious enough to justify rejection although the rest of the casting was sound. Analysis of the location of the defects, however, proved that the voids would not be detrimental if a reference line 4 inches from the intended line were used. This was done and the casting salvaged.

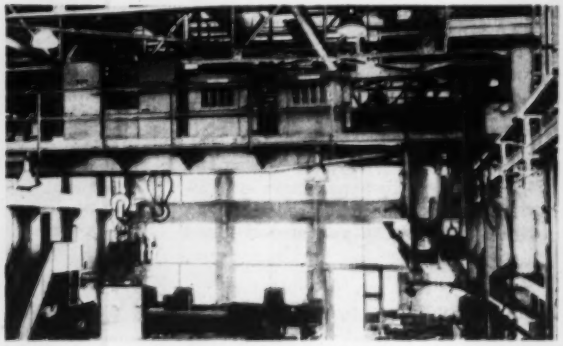
These defects could not have been located by any other practical means. Therefore, if the betatron had not been available, they would have turned up during machining, and the casting would have been scrapped with the accompanying loss of machining time, delay in obtaining another casting as well as loss of the value of the casting.

Operating Costs Low—The operation of the betatron itself has been economical, no more than the cost of lower voltage units. Power requirements are low because of the nature of the betatron. Maintenance cost is also slight. The two together account for only 20 per cent of the annual operating cost.



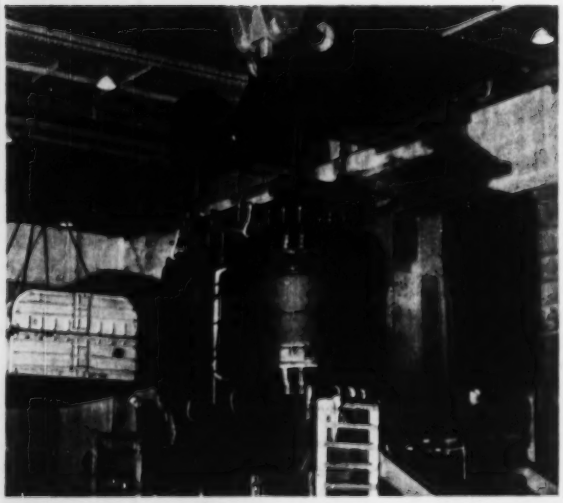
FOR ACCURATE CONTROL OF TRAVELING CRANES such as this one installed at a hydroelectric power station, Type IC7427 provides reversing plugging control.

FOR RAPID HANDLING OF BULK MATERIAL, Type IC7431 provides overspeed protection. Two-motor bucket drives are co-ordinated to reduce required master switch manipulation.

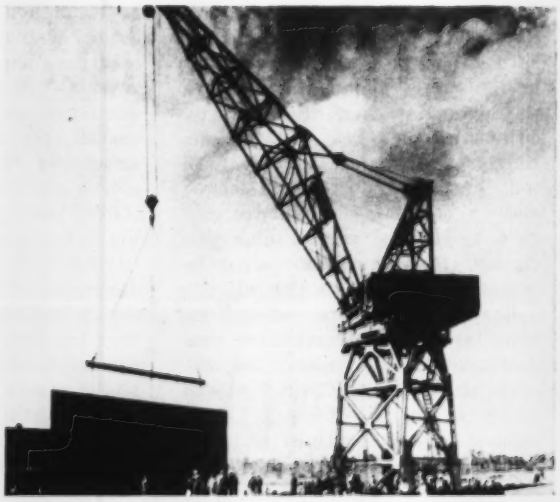


FOR FAST LIFTING, PINPOINT LOWERING, the Speed Variator Hoist Drive is ideal for applications such as this machine shop — provides superior speed characteristics.

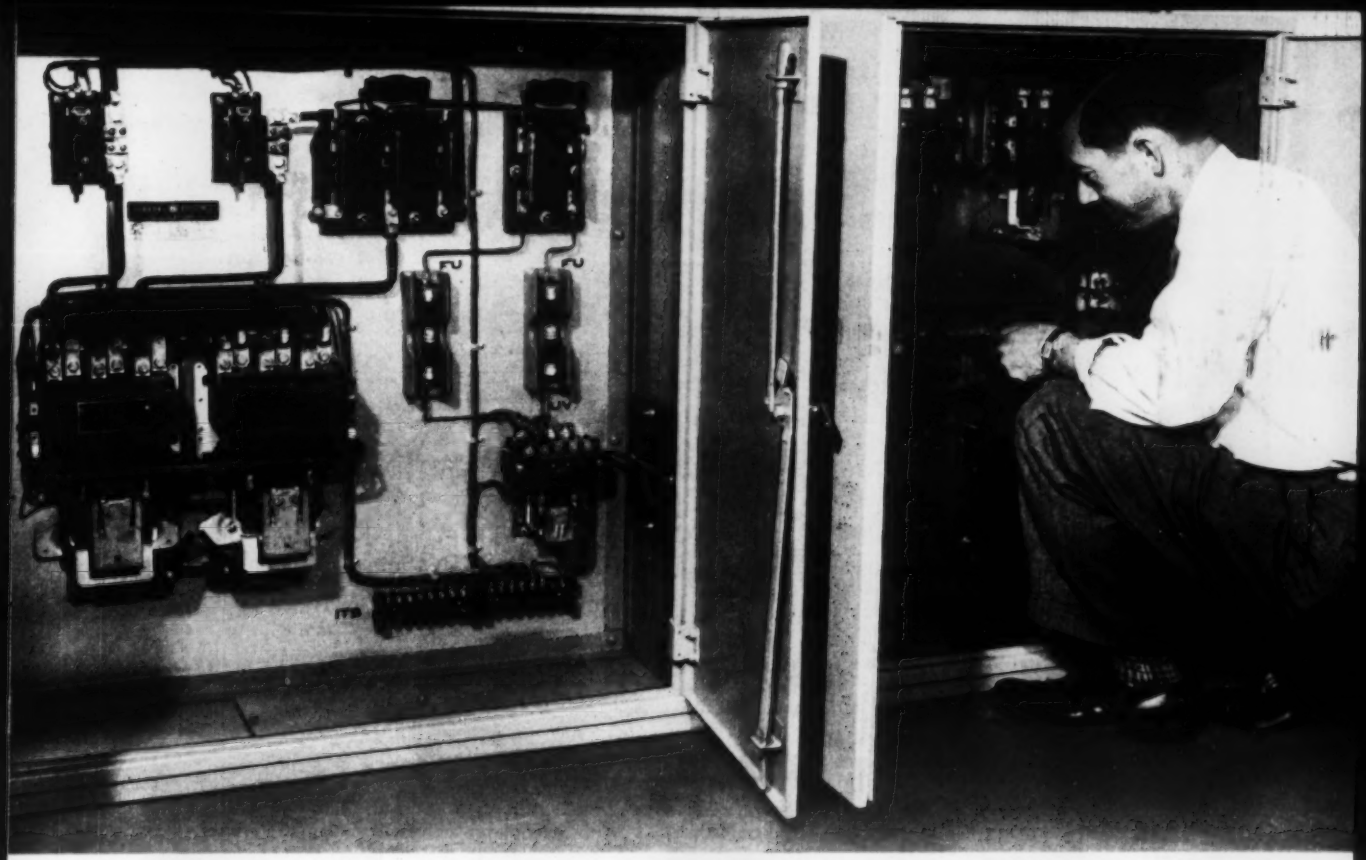
G.E.'s Complete Line of AC Control Gets



FOR STANDBY OR LIGHT-DUTY USE, where distances and speeds are not excessive, type IC7417 is used with a mechanical load brake. Ideal for power plant, warehouse, etc.



HEAVY-DUTY SERVICE AND DELICATE HANDLING are characteristics of the type IC7420, shown here in a shipbuilding yard. This control accurately spots nearly any load.



COMPONENTS ARE STANDARD DEVICES, easily replaceable from stock if ever necessary. Controls for 125 hp or less (440v) are front-wired in low-height, shallow-depth enclosures—permits easy installation of wiring, simplifies device replacement. Large conduit openings on bottom and sides speed wiring of interconnections. Doors swing out 17".

Maximum Performance From Your Crane

Control is "Job-tailored" to each crane

General Electric units are designed to accurately control every bit of power and movement your crane is capable of delivering. Each control in the complete line is "job-tailored" to your crane by experienced G-E engineers working closely with you and your crane manufacturer.

You'll find the *right* control for your application in the complete G-E line. In addition to the forms illustrated, type IC7422 control provides reversing hoist control for eddy current load brakes. Type IC7421 provides reversing hoist control with single-phase dynamic lowering.

Write for complete information on all forms of G-E a-c control, or contact your nearest G-E Apparatus representative.

Section C780-5
General Electric Company
Schenectady 5, N. Y.

Please send me your new bulletin GEA-6112, which gives complete information on G-E a-c crane control.

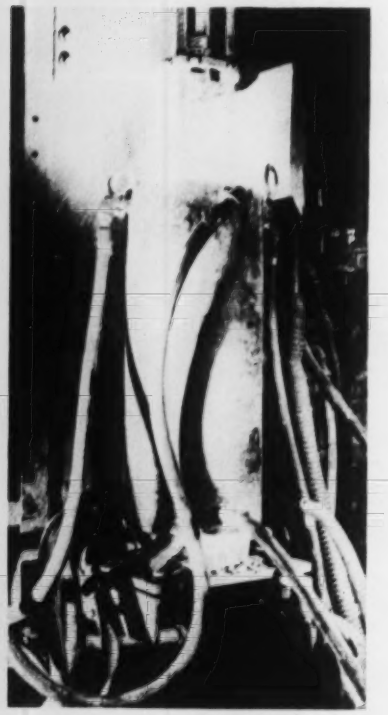
Name_____

Position_____

Company_____

Address_____

GENERAL ELECTRIC



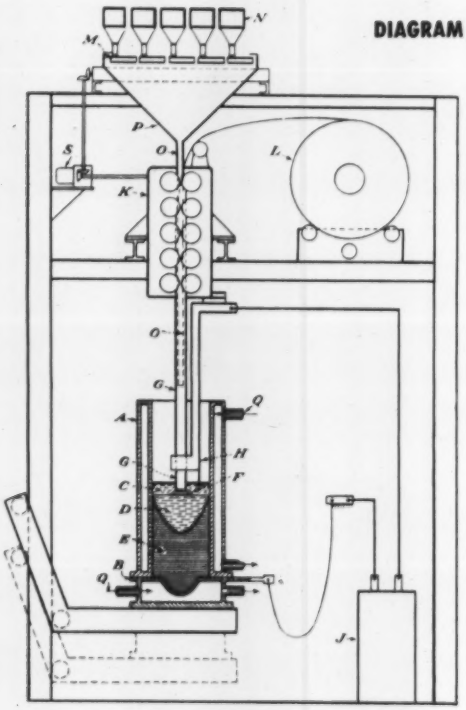


DIAGRAM OF ELECTRIC INGOT MACHINE

A. Water-cooled mold.
B. Water-cooled stool.
C. Molten flux.
D. Molten metal.
E. Solid metal ingot.
F. Current discharge.
G. Tubular electrode, consumable.
H. Contact shoe.
J. Power supply.
K. Tube-forming machine.
L. Coil of strip.
M. Alloy-metering devices.
N. Alloy hoppers.
O. Alloy conduit.
P. Collecting hopper.
Q. Water inlet.
S. Motor drive.

Schematic of the electric ingot process shows relative positions of operating components. Photo shows ingot being made. When completed to desired size, mold is swung aside and another readied for production

Electric Ingot Steel

Old Process Solves Jet Age Problem

It will never put the conventional mills out of business but it can do a better job on high alloy steels. Electric ingot process bears looking into if you're an alloy producer

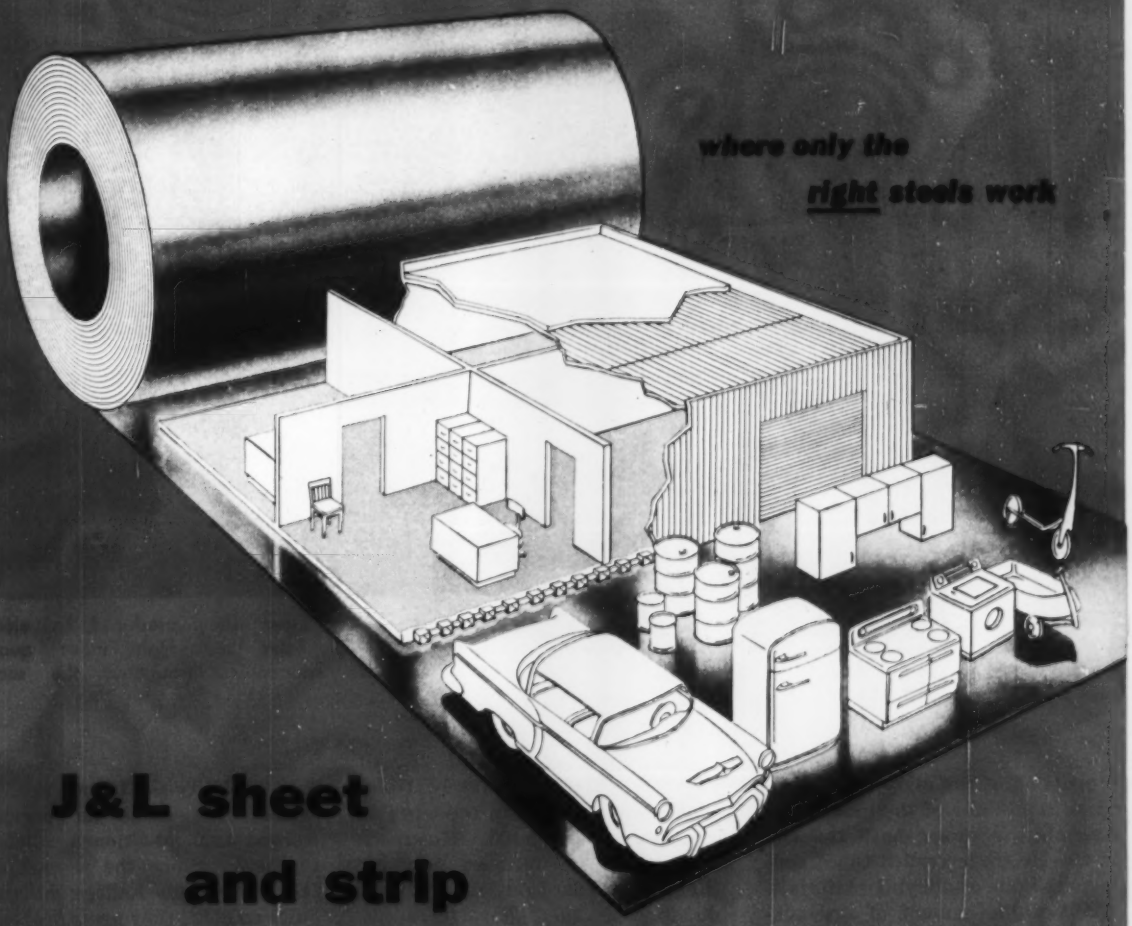
SUPER ALLOYS for jet engine turbine wheels, difficult to produce with conventional steelmaking methods because of quality requirements, pose no problems when the electric ingot process is used. Oddly enough, this system, developed in 1936 to solve a different problem, is effectively answering the needs of an industry that didn't even exist when the technique was born.

Nonmetallic inclusions, voids and other inconsistencies in these super alloys do not heal themselves in rolling like they do in low alloys, so it became apparent that existing methods of production just weren't going to be good enough. M. W. Kellogg Co.'s electric products division thought their process would work.

Success — Kellogg built a machine, and under R. K. Hopkins, manager of the electric products division, an intensive research program was initiated. It soon developed that the electric ingot process would produce an ingot with uniform analysis, minimum segregation and high yield of usable metal.

What's more, the process itself embodied such favorable characteristics as continuous melting and casting, progressive solidification, flexibility, low cost of molds per ton and ability to make small as well as relatively large ingots.

Here's How—Main elements of the process are the alloy hoppers, rolls that form strip into a tube-like electrode and a water-cooled mold and stool assembly that can be raised or lowered during melting. Melting is initiated by supplying a small quantity of crushed alloying materials, mixed in the



J&L sheet and strip

Your particular requirements for formability, uniformity, and drawing qualities determine every step in the production of your order of J&L Sheet and Strip.

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And J&L quality control assures accurate adherence to your specifications.

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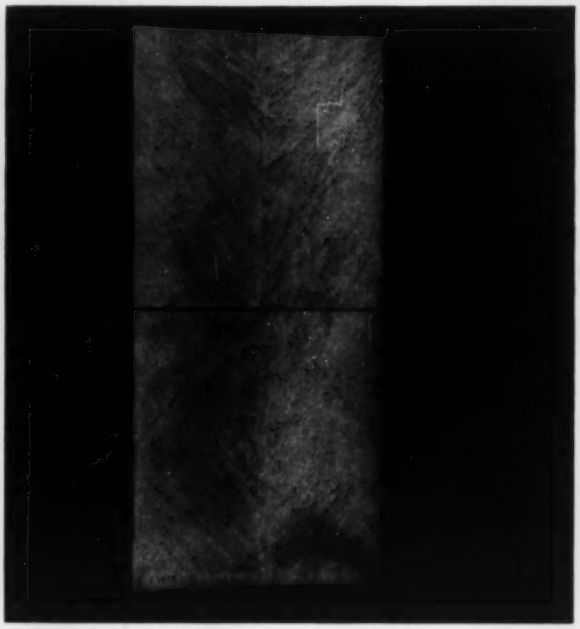
J&L STEEL

Jones & Laughlin

STEEL CORPORATION — *Pittsburgh*

Operator inspects metering device which controls flow of granulated alloying materials into the electric ingot machine. Materials are stored in bins



Macrograph of a super alloy produced by electric ingot process illustrates the high ingot quality. Notice complete soundness throughout the section

proportion of the alloy to be melted, to the center of the mold stool. Assembly is raised until the end of the electrode (rolled tube) contacts the pile of alloying materials.

A suitable amount of dry synthetic flux is added to the mold to cover the entire stool and material in it. The electrical contactor is closed and the tube-forming machine is started. It is only a matter of seconds until the flux blanket is liquefied and the alloy-making process is under way. As the level of the alloy rises, the mold is retracted from the machine, and this continues until the desired length of ingot has been made.

Controlled Metering — In the case of super alloys, coiled strip is almost pure iron, so it is necessary to add alloy materials to the melt to produce the desired steel. This is accomplished by metering each alloying element through a separate feeding device driven by the same motor that drives the tube-forming machine. In this way, rate of alloy addition is synchronized with rate of electrode consumption.

Alloying materials are obtained in free-flowing crushed condition and stored in individual hoppers. They fall freely from the metering device to the current discharge in the mold. However, since they are released only at the proportionate rate for the production of the alloy intended, there is no chance of a discrepancy occurring because of this free-falling action.

No Refractories—Process is free from refractory linings, and, owing to the fast solidification resulting from use of water-cooled molds coupled with relatively slow melting rate, progressive solidification is obtained. There is a definite balance between the rate of heat input and heat removal. Presence of the molten bath in what might be considered a crucible of solidified metal of same analysis has a distinct stress relieving effect on solidified metal.

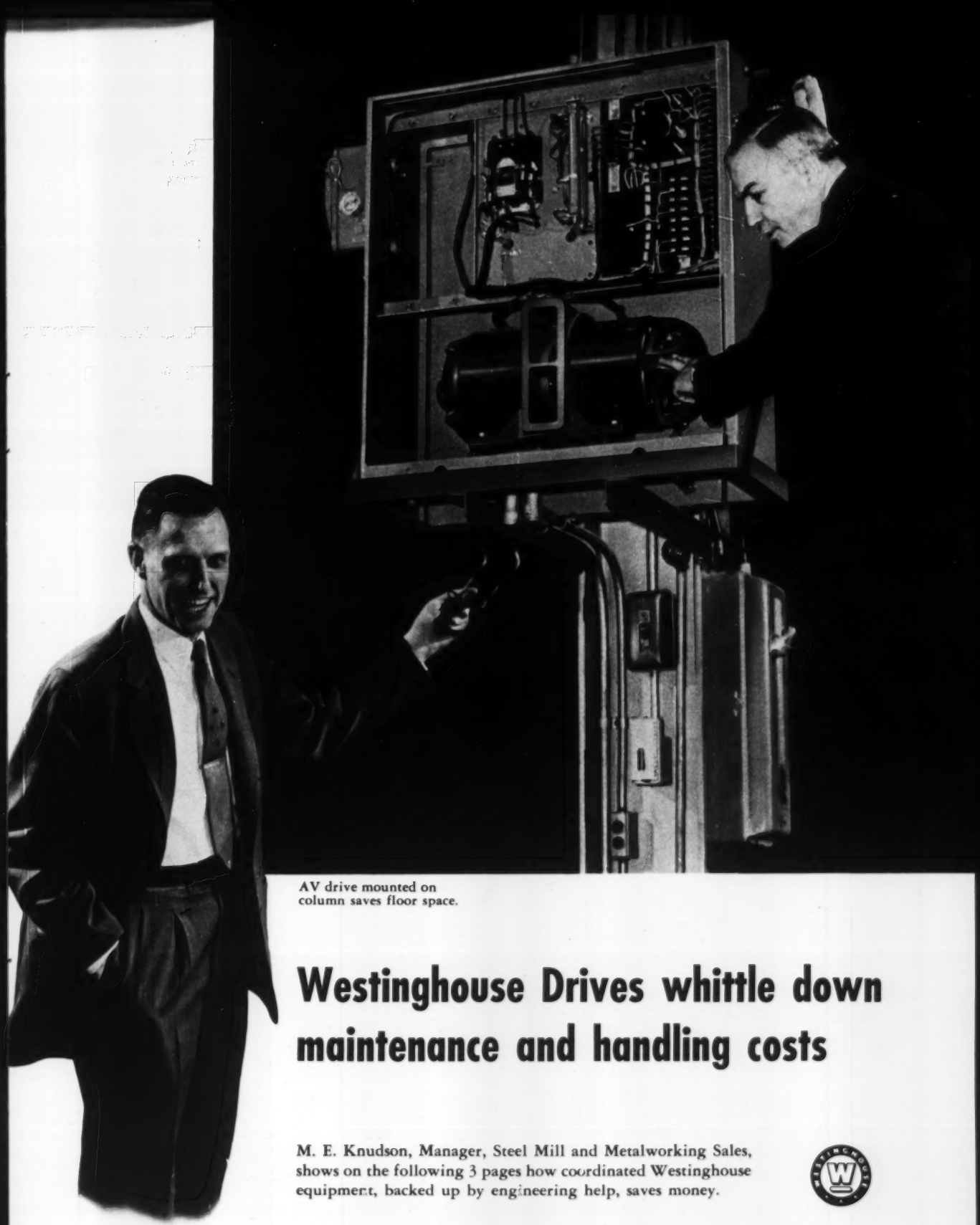
The raw materials used in making these ingots are literally injected, in solid form, below the surface of a molten blanket of flux, where they are liquefied and put into thorough solution and then solidified. Thus they have never been exposed to the atmosphere, and melting losses are kept very low, virtually all elements showing a 100-per-cent yield.

Workability — Ingots are considered the same as normally worked and conditioned billets in the mill. Since the as-cast surface of certain Kellogg alloys is quite smooth, they are suitable for direct forging or roll reduction without any surface conditioning.

Mechanical properties of electric ingot steel in both cast and worked forms are very good. Outstanding improvement as compared with conventionally-cast steels is in the ductility, and this is especially true in the central area of large sections such as gas-turbine wheels.

Some Drawbacks—No scrap can be used in the charge. In addition, some of the raw materials used cost more in the required form (granulated) than when used in conventional furnaces. These drawbacks eliminate the process from the field of cheap steels, such as plain carbon steels and most of the SAE grades.

However, the economical disadvantage of high cost of raw materials is more than offset by the greater amount of good metal obtained and the generally superior properties of this metal, Kellogg officials feel.



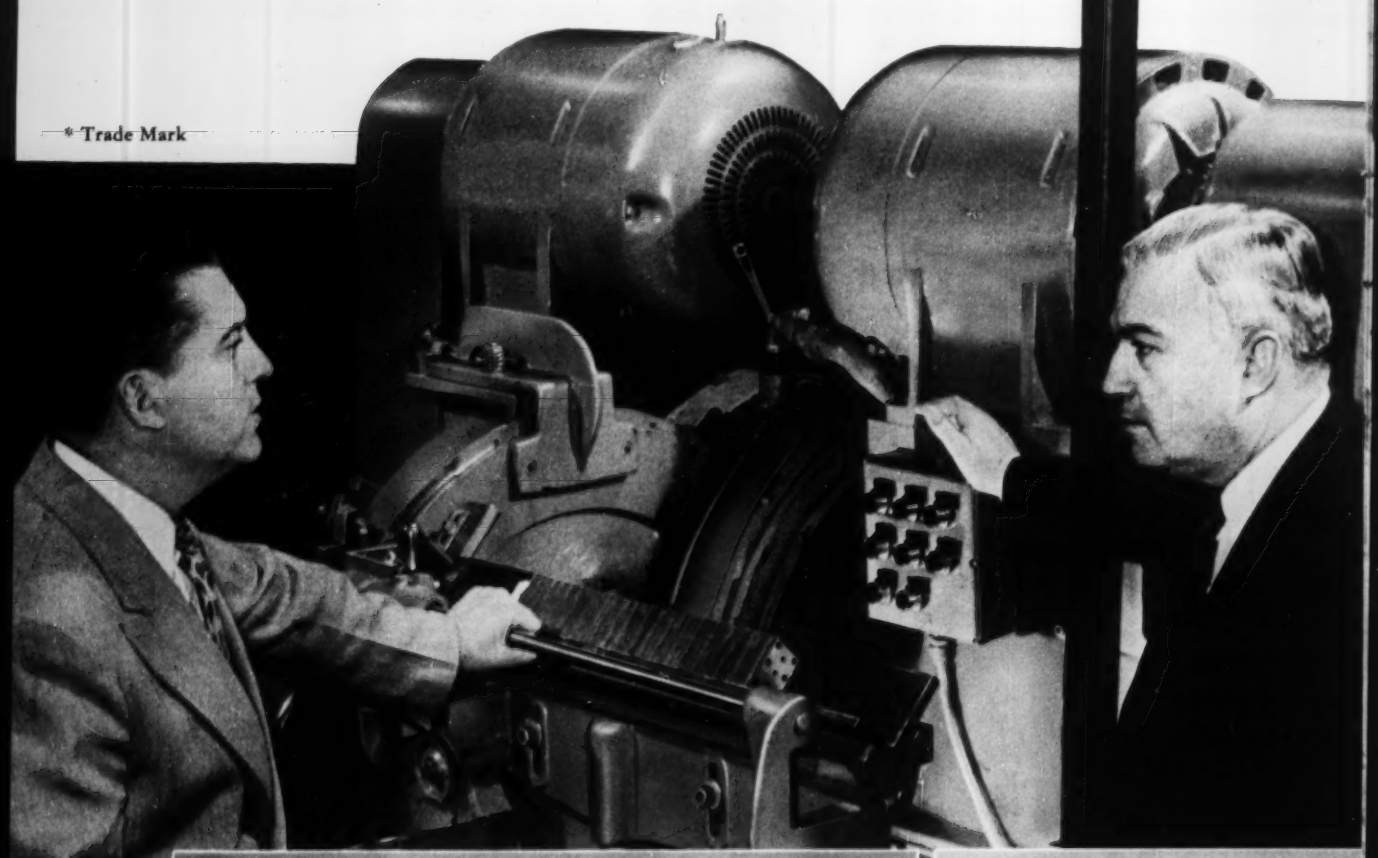
AV drive mounted on
column saves floor space.

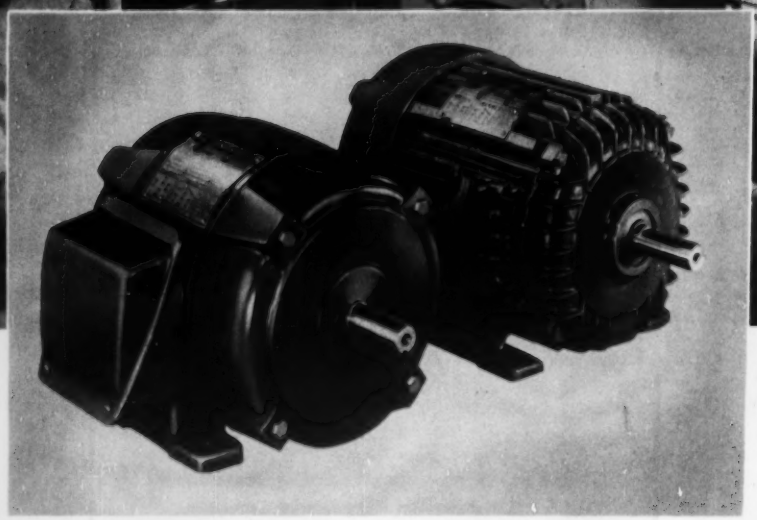
Westinghouse Drives whittle down maintenance and handling costs

M. E. Knudson, Manager, Steel Mill and Metalworking Sales, shows on the following 3 pages how coordinated Westinghouse equipment, backed up by engineering help, saves money.

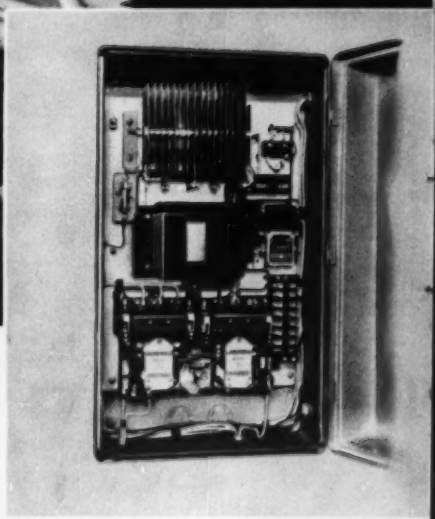
Two Westinghouse Motors power this surface grinder, working on valve plates. It doesn't need the speed finesse required on the centerless grinder, but its controls must have protection from splashing oil. A Westinghouse Oil-Tite* Pushbutton Station, conveniently located, answers that problem.

* Trade Mark





New totally-enclosed Life-Line® "A" motors are designed to give you greater application flexibility at locations where motors get heavy doses of chemicals, liquids, dust and dirt. Every component in the new motor is redesigned and integrated with the whole.



D-c braking, with a new Westinghouse Braking Controller like this, stops a motor without having mechanical apparatus attached to the motor shaft. It provides a smooth rolling stop with no reverse rotation. Use d-c braking for stops to change tools or prevent damage.

Coordinated drives on grinders save maintenance time and money

Westinghouse Engineers, called in to help a customer with application problems, make a habit of coordinating electrical equipment in dollar-saving ways. The flexibility of the Westinghouse complete line—plus the equipment's ruggedness and maintenance-free features—makes their job easier. Here are some examples:

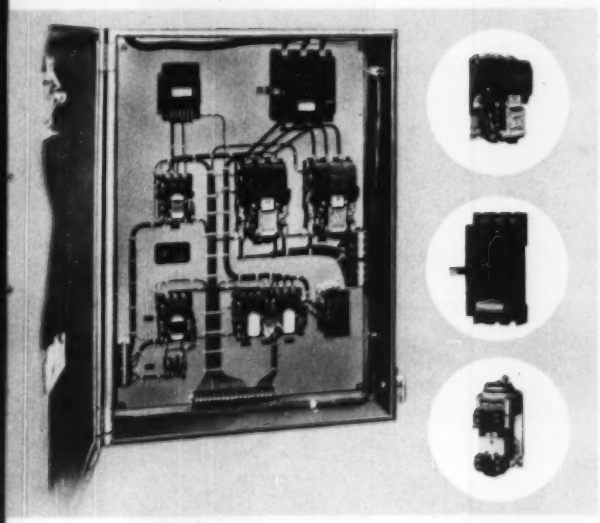
Westinghouse Life-Line AV Drive package has proved its efficiency over many years of rugged assignments. It's a complete, adjustable-voltage drive system—a factory-engineered package with selenium excitation. Use it wherever you need exacting control of a d-c motor from an a-c power line. Choose any of the Life-Line d-c motors or gearmotors—explosion-proof, dripproof, totally enclosed—and you'll get these features: rugged construction; dynamic balancing of all rotating parts; Tuffernell® insulation of windings for maximum strength; pre-lubricated bearings.

Life-Line contactors and other heavy-duty control components—proved in the toughest industrial application—are used in the design of the AV drive. For example, the contactor is designed with fewer moving parts. The entire contact assembly pivots on a knife-edge of specially hardened steel. There are no sliding surfaces to bind or wear, and no misalignment troubles. Nothing can jam or stick. Kickout springs give sure contact openings, independent of gravity.

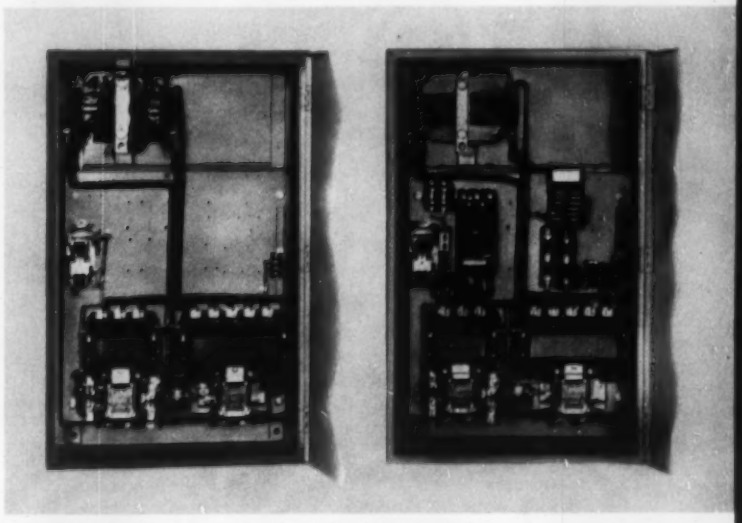
Westinghouse Mot-O-Trol®, used for operation of d-c motors from a-c sources, starts the motor and brings it rapidly and smoothly to a pre-set speed. Mot-O-Trol drive systems, designed specifically for metal-working applications with speed ranges in excess of 100 to 1, are available. You get automatic speed regulation, and the single dial provides finger-tip control throughout the entire speed range.

YOU CAN BE **SURE**...IF IT'S

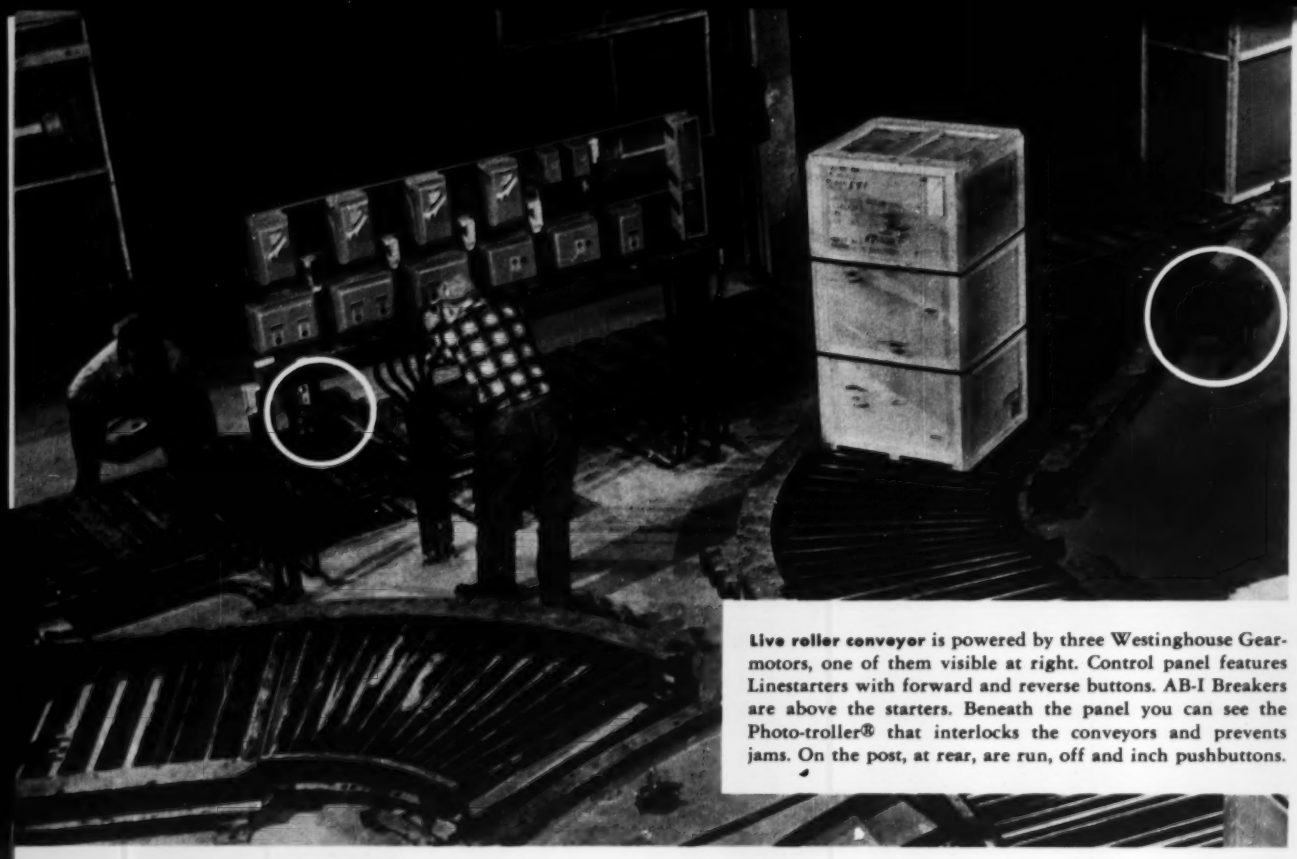
Westinghouse



Complete line of components for machine tool control panel—that's what Westinghouse offers. Life-Line Contactor (top inset) is a make-up device. AB Circuit Breaker (middle) has De-ion® arc extinction. Type AM Time Delay Relay has double-make, double-break contacts.



Add-λ-Part panels mean flexibility! Panels of the starters on this exclusive Westinghouse innovation have drilled and tapped holes to accommodate any common modifications you need. It's easy to modify new starters right on the spot by adding transformers, fuses, or timing relays.



Live roller conveyor is powered by three Westinghouse Gearmotors, one of them visible at right. Control panel features Linestarters with forward and reverse buttons. AB-I Breakers are above the starters. Beneath the panel you can see the Photo-troller® that interlocks the conveyors and prevents jams. On the post, at rear, are run, off and inch pushbuttons.

Gearmotors . . . plus traffic lights . . . run this 3-track intersection

Westinghouse equipment and engineering save money in the warehouse, too. Apart from the obvious cost reduction gained by automatic materials handling, there's a saving here in maintenance dollars. Westinghouse Gearmotors, for example, have the exclusive horizontal split gear case that makes inspection simple and speedy. Remove a few bolts, lift the gear cover, and all gearing parts are ready for removal. No intricate subassemblies. No need to drain oil, disturb the unit's mounting, or disconnect it from the driven load.

AB Breakers give you long, maintenance-free service in your distribution system. Check these construction "firsts": non-welding, silver-alloy butt contacts . . . corrosion-resistant bearings and parts . . . electrically welded connections. De-ion arc quenching—instant, safe extinguishing of hot arcs—means protection and long breaker life.

Backing up Westinghouse apparatus and engineering assistance are important extra services. Repair Plants — 38 of them — are equipped to repair all types of electrical apparatus. Renewal Parts Warehouses are located in 31 industrial centers. You'll find your nearby Westinghouse representative eager to put these facilities at your service. Westinghouse Electric Corp., 3 Gateway Center, Pittsburgh, Pa.

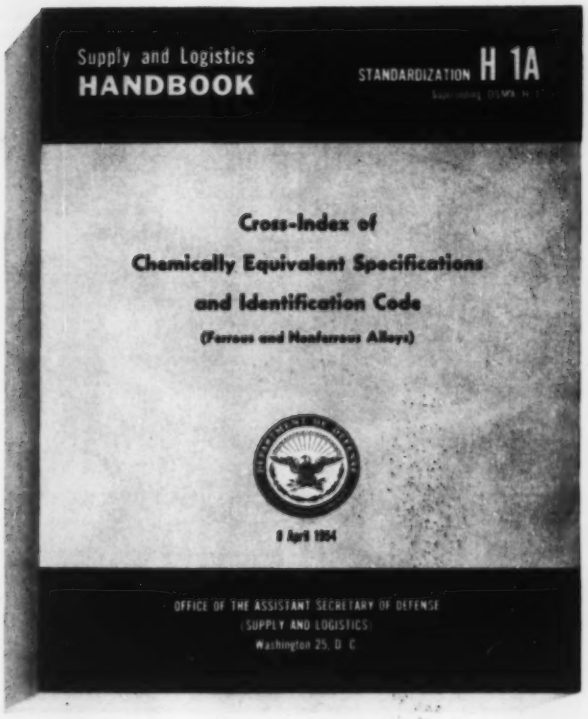
MP-3018

YOU CAN BE SURE...IF IT'S Westinghouse

Perry Croco, Engineering Manager in the Westinghouse Pittsburgh office, backs up salesmen in his territory with first-class engineering help. Put him—or his counterpart in your area—to work for you. Ask your Westinghouse representative for these books: *New Life-Line "A" Motor* (B-6154-A), *AV Drives* (B-5808), *Complete Industrial Control* (B-6051), *Automatic Control* (B-5882), *Westinghouse Equipment for Automotive Industry* (B-5651), *Westinghouse Gearmotors* (B-5645), *Westinghouse Speed Reducers* (B-5646). Or write to Industrial Products Advertising, Westinghouse Electric Corp., 3 Gateway Center, Box 868, Pittsburgh 30, Pa.

MP-3018

More Help With Metal Specs



New Department of Defense Handbook is a Cross-Index that defines and compares the composition of all metal specifications. Here's how you can get it

YOU NEED all the help you can get these days to untangle metal specifications.

You can get it from the new revised cross index of chemically equivalent specifications for steel and nonferrous alloys, just published by Department of Defense.

It's a 345-page reference book that defines and compares the compositions of all metal specifications. It will save you valuable production and engineering time by curbing confusion about the various specification systems.

Scope—Listed and cross-indexed are specifications of Army, Air Force, Navy, AISI, Dept. of Defense (MIL and JAN), ASTM, SAE, Aeronautical Standard Group, General Services Administration, (Federal), Aeronautical Material (SAE) and Aluminum producers.

Metals included are iron and steel, copper, nickel, cobalt, titanium, lead, tin, silver, aluminum, magnesium, zinc, bismuth, cadmium, antimony, gold, platinum and their alloys.

Up-To-Date—The handbook is a revision of a previous cross index completed late in 1952. A realization of the need of the metalworking industry for a complete rundown on metal specifications led STEEL to undertake publication of its Specifications Handbook based on the government's 1952 edition. Over 20,000 copies of STEEL's handbook were distributed, but the supply is exhausted; and because of revisions included in the new edition, it will not be republished.

How—To keep posted on the latest information on specifications, you can obtain copies of the new government handbook through STEEL's Readers' Service department, or from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Cost is $1.75 per copy, postpaid, payment with order.

When ordering from the Government Printing Office, ask for Supply and Logistics Handbook H 1A, "Cross-Index of Chemically Equivalent Specifications and Identification Code." When ordering through STEEL, use coupon below.

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Send me_____copies of the government's Cross-Index on metals specification at $1.75 per copy, postpaid. Enclosed is my check for_____.

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Dual personality...

with one idea in mind—profit!

Both metal hog, and tolerance miser — this versatile machine's only goal is turning out better work faster. It's the G&L 350-T Horizontal Boring, Drilling and Milling Machine

HERE'S how this ultra-precision, 30 Series table-type machine helps you increase boring, drilling and milling efficiency. First of all, its open construction and rigidity allow you to handle either large or small work with equal precision on a production or custom run basis.

Furthermore, it's exceptionally versatile. Take the helicopter rotor hub job, illustrated at left, as an example. Here a 350-T helped produce a complex 250-lb. finished part from 3000-lb. forging . . . yet maintained tolerances to .0007"!

It's this kind of capacity, versatility and precision that helps you not only handle your current work more profitably . . . but also gives you extra capacity to handle future work requirements.

For complete details on this 5" spindle, 25-hp machine — or for information on all G&L quality-built Horizontal bars with 3-4-5-6 or 7" spindles; in table, floor or planer types — contact your G&L representative or write —

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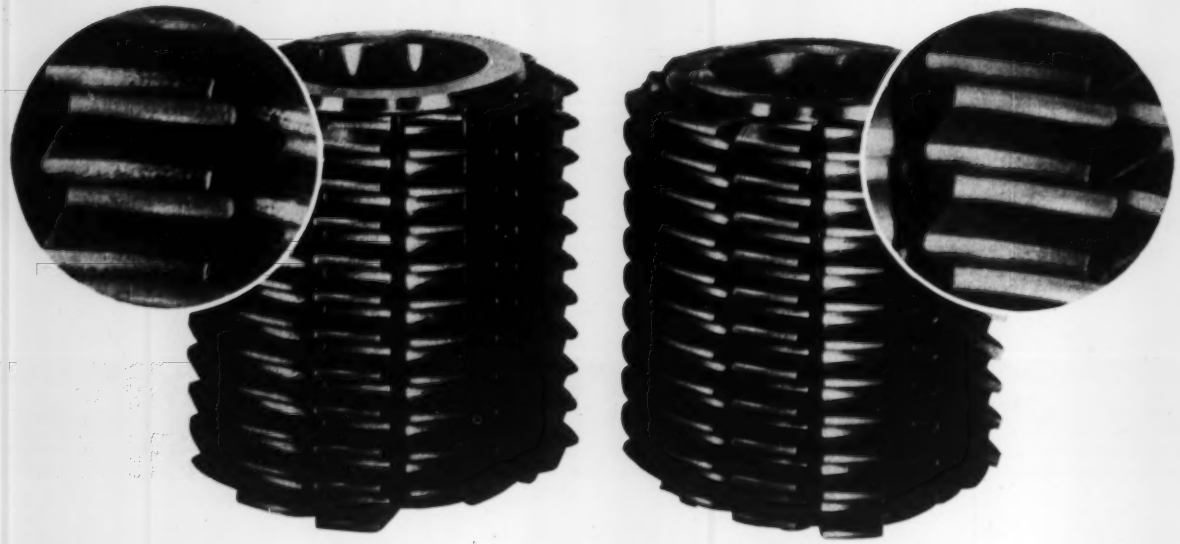
Builders of the world's finest heavy-duty machine tools — Horizontal Boring, Drilling and Milling Machines — table, floor and planer type; Hypro Double Housing and Openside Planers, Planer Type Milling Machines; Vertical Boring Mills; and Davis Cutting Tools

Photo courtesy of Magna Mill Products, South Gate, Calif.



REGULAR **SULPHIDE ADDITIVE**

Gear hobs from high speed steel show the effect of internal lubricant

Cutting Edge Lubricant

Sulphur added to tool steels gives free machining and longer tool life in some cases. Producer opinion is divided, and users want to test the new steel in their own plant

FOR YEARS cutting tool people would have given a right arm for a gear hob material that prevented tearing and gave better surface finishes. Some tried semi-hard forgings with limited success, but, by and large, the mystery remained unsolved.

That is, until Latrobe Steel embarked upon what figured to be just another exploratory project. To help a customer, they formulated a tungsten-molybdenum, high-speed steel that contained about 0.1 per cent sulphur. Test results (later confirmed by the customer) were astounding. The special M2 material not only offered the desired machinability but also promised to outwear Latrobe's regular M2 grade.

From this rather routine beginning, the material has blossomed out to such an extent that J. Workman, vice president of sales, now says: "We feel so strongly about their continued success that we are replacing our regular warehouse stocks with them. By so doing, we are supporting our belief that eventually all high alloy tool steels will be furnished as material of the sulphide-lubricated type."

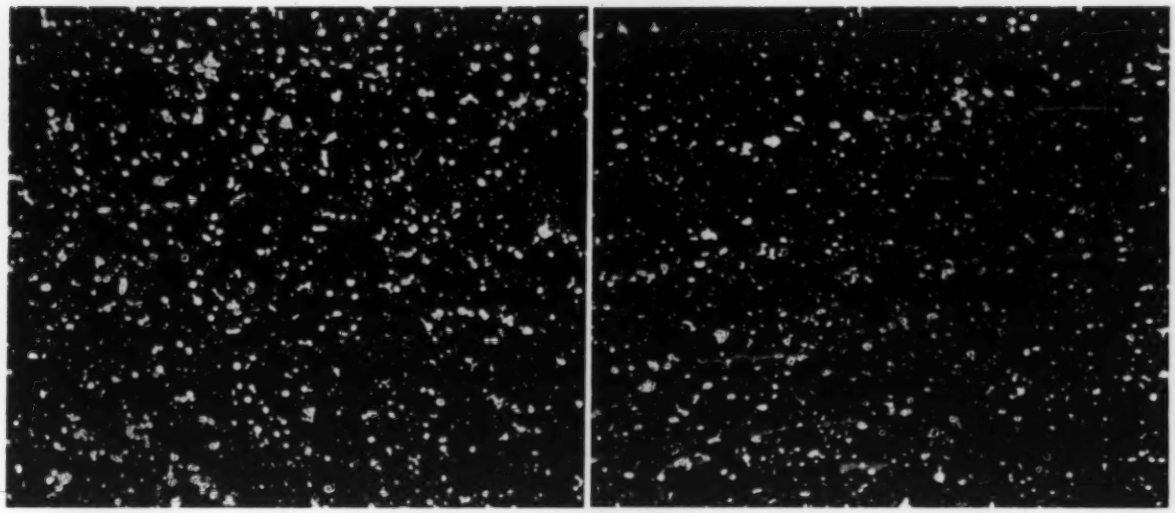
Start—To make these tool steels, sulphur is added during the alloying process. Latrobe metallurgists say they are not sure of the exact nature of the alloy sulphides in the steel. They appear in much the same manner as carbides. A patent is pending; if granted, Latrobe says it will license at a nominal charge.

Sulphide additives in the high-carbon, high-chromium type steels improve machinability same as for the high speed type. For example, the D2 type, 1.5 C, 12 Cr, can be machined up to 100 per cent faster with the sulphide additive.

Other similar grades show improvement, too. But it's too early to draw conclusions on increased tool life that may result under these conditions.

A patent on sulphur in high carbon, high chromium steel was granted to Simonds Saw & Steel Co., more than 10 years ago. Latrobe ran into this patent and is working under a license from Simonds.

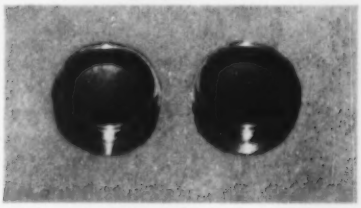
Checkup—Naturally, there were questions on the effects of the sulphide additive on heat treatment,



Photomicrograph at left shows alloy carbides in M2 grade of high speed steel; right, same steel with added sulphur

Built-In

Cheeking tool life increased 45 per cent by changing to M2 sulphur steel



In threading heat treated 4130 parts, pieces-per-grind increased from 200 to 1226 with sulphide containing M2

mechanical properties, etc. Latrobe's laboratory has found no change compared with nonsulphur tools. Detroit Testing Laboratory reports that grain size, impact, cutting edge strength, transverse bend, tensile and ultimate strength are not affected.

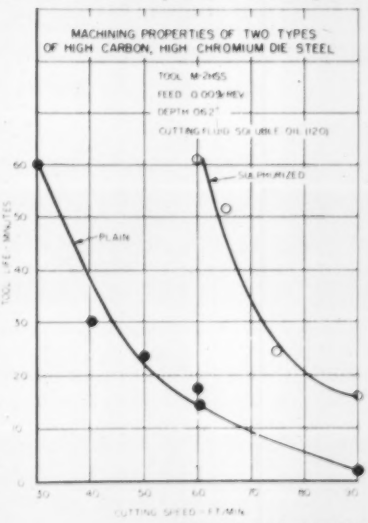
Industry-wide, tool steel producers are divided on the impact of the free machining grades. Some are offering the F-M variety. Others insist that purity is more important and are sticking with the wait-and-see attitude.

Both sides are gathering case histories to prove their point. Interest in the development is pushing tool steel research at the fastest pace ever. This is bound to pay-off for the user with better materials.

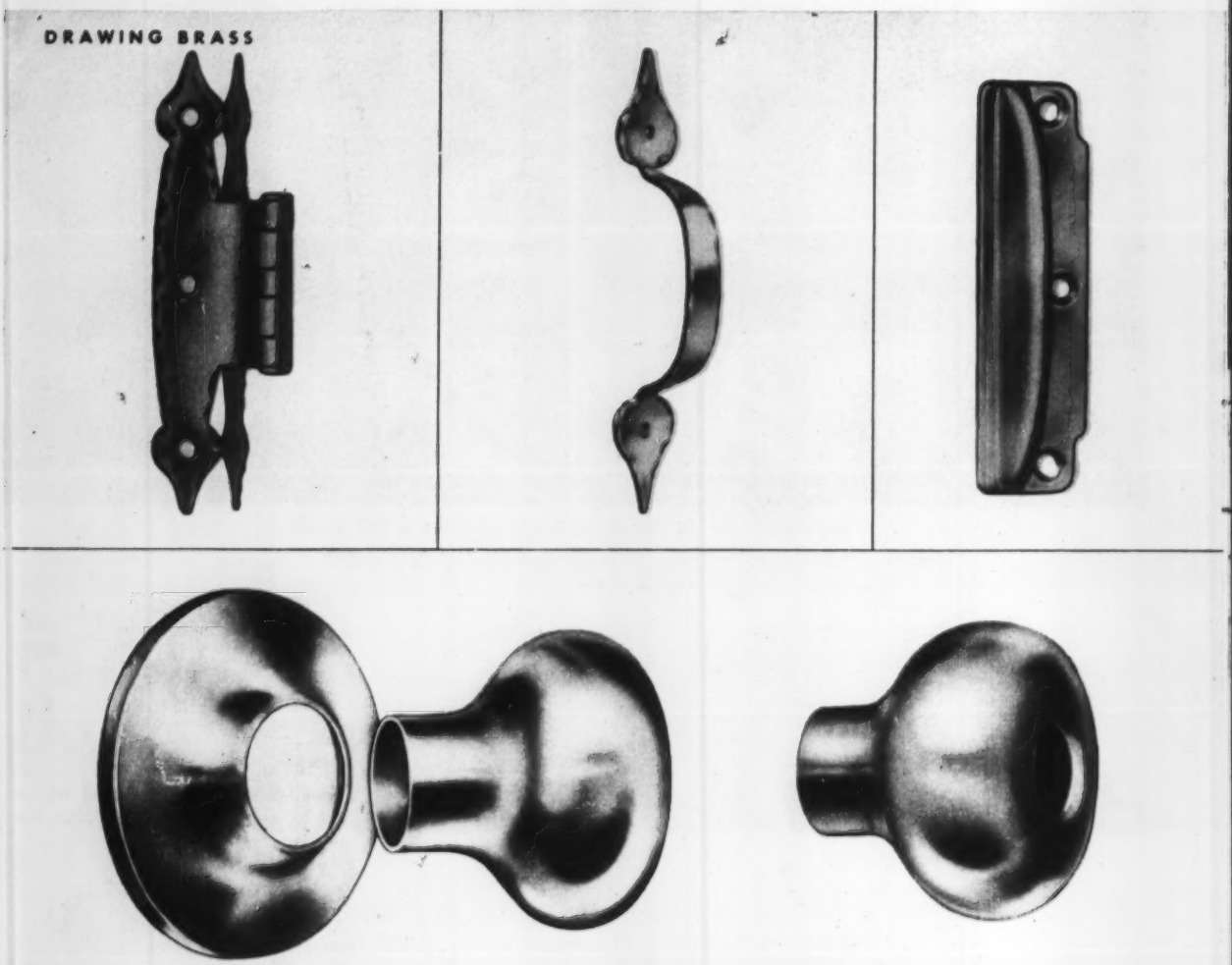
Evidence — Certainly, there is evidence that sulphur gives longer tool life in some cases. Getting back to gear hobs, Latrobe cites the case of an auto producer who reports 0.017-inch average tool stock removed per grind for regular M2 hobs and only 0.0085 for the sulphide material.

In another case cutting speeds were increased from 226 to 402 sfm in turning, boring and facing without hurting tool life. A Detroit plant says crankshaft turning tool life has gone up to 28 per cent with SAE 4145, heat treated to BHN 229 to 269.

Proof of the pudding is still in the making. Most tool and die steel users say they want to make tests in their own plant to see what sulphur can do for them.



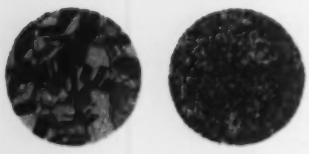
Metcut Research Associates
Using Latrobe Olympic Steel



THESE HARDWARE ITEMS are made by Adams Rite Mfg. Co., Glendale, Cal., and National Lock Co. and American Cabinet Hardware Co., both of Rockford, Ill. They are typical of the stamped, drawn and pressed products

Formbrite—Anaconda's new drawing brass—polishes up to

Superfine grain makes Formbrite harder, stronger, springier and more scratch-resistant



75X magnification of ordinary drawing brass. 75X magnification of superfine-grain Formbrite.

Here is what enthusiastic manufacturers of stamped and drawn brass products say about *Formbrite:*

". . . cuts our polishing costs up to 50% . . . eliminates some finishing operations entirely . . . gives amazingly sharp die impressions...resists scratching in handling . . . plates beautifully . . . gives a more lustrous finish . . ."

Yet *Formbrite** costs no more than the ordinary drawing brasses these manufacturers had been using. In fact, Formbrite very often saves more than the metal itself costs.

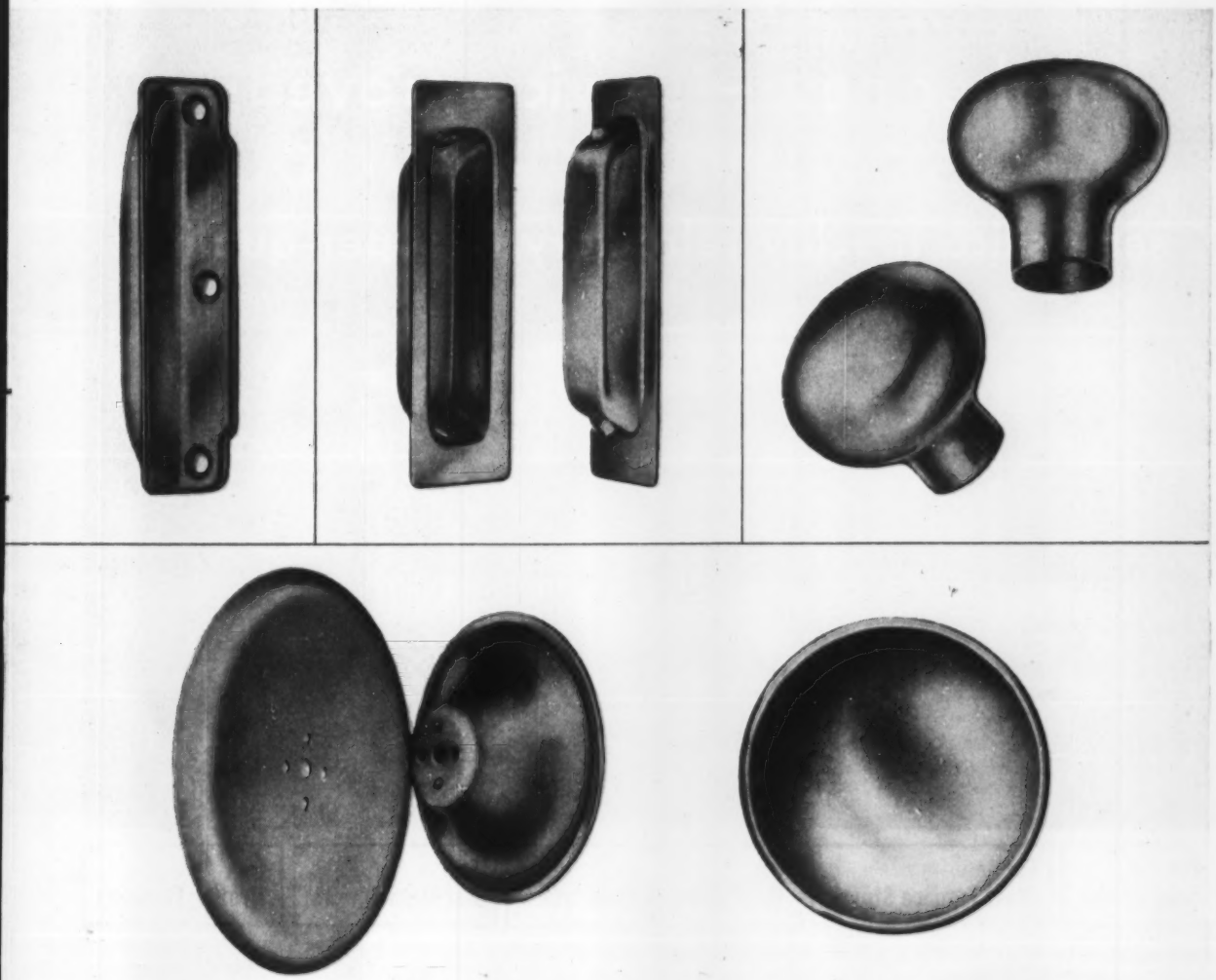
Why Formbrite is easier to use

Note Formbrite's superfine grain structure. Compare it with that of ordinary drawing brass. Special methods of rolling and annealing produce a grain structure so fine that often a simple color buff will bring it to a bright, lustrous finish.

Formbrite is also harder, stiffer, springier and more scratch-resistant . . . yet it is surprisingly ductile, readily stamped, formed, drawn and embossed.

Typical case

The Adams Rite Mfg. Co. makes the flush pull shown in the upper right



successfully made of Formbrite. Others include: lipstick holders, fishing lures, automobile hubcaps, gage cases, trophy nameplates, pen caps, etc. (Doorknob parts in lower left illustration have been chromium plated.)

50% faster...costs no more than ordinary drawing brass

illustration above. For this and many other building hardware items, they use Formbrite. They report:

"Formbrite increases surface hardness and rigidity of the part . . .eliminates several polishing operations and reduces over-all costs. Our flush pull definitely has been improved in quality."

Free sample

Formbrite is available in sheet, strip and coils—in all commercial widths and gages. Millions of pounds of this superior drawing brass have been made, sold and satisfactorily fabricated.

Want more proof? Mail the coupon and we'll send you a sample of Formbrite. Try it in your polishing room. See for yourself how quickly and easily Formbrite polishes. 5488

*Reg. U. S. Pat. Off.

Formbrite

FINE-GRAIN DRAWING BRASS

AN ANACONDA® PRODUCT

MADE BY THE AMERICAN BRASS COMPANY

FREE SAMPLE—Test Formbrite Yourself

The American Brass Company, Waterbury 20, Connecticut

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☐ Send me a free sample of Formbrite to try in my polishing room.

☐ Send me Publication B-39, giving forming and finishing suggestions.

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another new—service-proved—

HARBISON-WALKER PRODUCT

semi-silica fireclay refractory of super-quality

For Soaking Pits | **For Blast Furnace Stoves** | **For Open Hearth Regenerators** | **For Hot Metal Mixers** | **For Heating Furnaces**

service

KAOSIL, having an added margin of the particular, beneficial properties of semi-silica fireclay brick is a truly unique refractory. The enhanced physical and chemical properties of KAOSIL extend the range of usefulness of the highly siliceous type of fireclay refractories.

composition

KAOSIL is made from exceedingly fine grained siliceous kaolin of exceptional purity and uniformity. Its silica content is approximately 75 percent and its content of basic oxides of alkalies and alkaline earths is phenomenally low—less than 1 percent.

superior characteristics

KAOSIL has exceptional stability under load in soaking heats of long duration.

Purity in composition of KAOSIL accounts for its high refractoriness and high temperature of vitrification.

The resistance of KAOSIL to structural spalling and fluxing by alkali laden gases are other properties of prime importance.

Excellent workmanship is assured by the power press method of forming.

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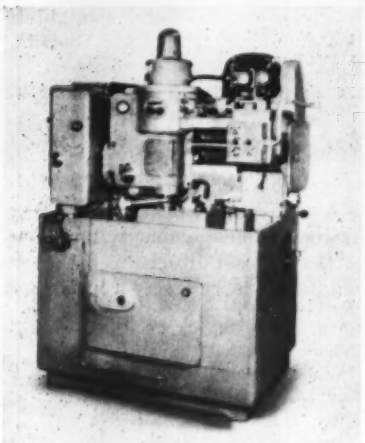
NEW PRODUCTS and equipment

Reply card on page 129 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue

Gear Shaper

. . . 6-inch pitch diameter

The No. 4GS gear shaper has a capacity of 6 inches pitch diameter, 2 inches face diameter and 2 inches face width for external spur



and helical gears. The maximum diametral pitch is 5/7 for spur gears and 6 for helicals. The machine uses a 4-inch pitch diameter cutter mounted on a 3⅜ inch diameter cutter spindle reciprocated through a 2½-inch rock-shaft driven from a crankshaft.

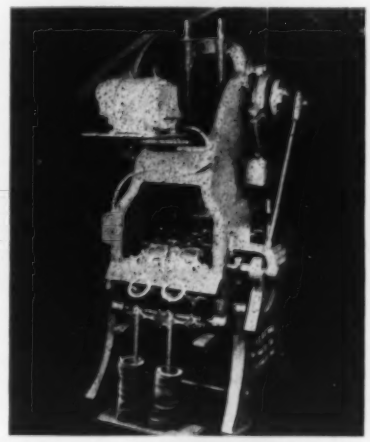
The rotary feed of cutter and work is governed by pick-off gears. Other features include: Improved depth feed mechanism; air operated saddle return; cam trip mechanism. The 4GS is particularly adapted to arrangement for automatic loading and unloading. Fellows Gear Shaper Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 1

High Speed Press

. . . with conveyor-type feed

A high speed press featuring a conveyor-type feed is operated by one workman. It is capable of producing up to 7200 pieces per hour.



The press offers distinct safety advantages in stop mechanisms.

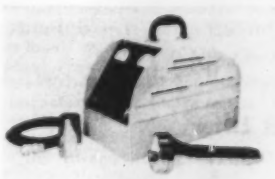
It is built for hard usage and for years of continuous service and it incorporates all important Federal features. The company will engineer each unit in accordance with specific requirements and individual die problems. Federal Press Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 2

Vibration Analyzer

. . . to eliminate vibration

This portable electronic vibration analyzer is capable of balancing rotating parts at speeds up to 5000



rpm and of tracing any vibration up to 20,000 cpm. It is designed to eliminate vibration in production machinery and to simplify maintenance of plant equipment through dynamic balance of rotating parts.

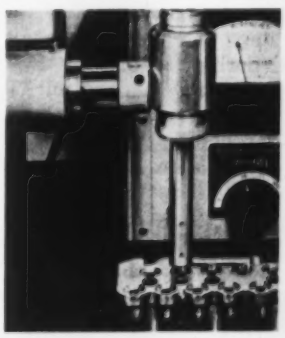
It weighs only 25 pounds, balancing with the aid of a stroboscopic lamp with a range up to 5000 flashes per minute, done through a short four-step procedure. A part is balanced while running at design speed in its own bearing and analysis accomplished through electronic frequency and displacement circuits which render data on panel meters. Accuracy to 10 per cent is maintained on all three ranges, 0.001, 0.01 and 0.1 inch full scales. International Research & Development Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 3

Profilometer Tracer

. . . measures surface roughness

The Profilometer Type GC tracer is for measuring surface roughness across the bottom of flat-bottomed grooves and slots to ¼-inch



depth and behind shoulders to ¼-inch height. When measuring crosswise, it permits 1/16-inch length of trace in slots of 5/32-inch width and greater length of trace in wider slots. It measures lengthwise in slots as narrow as 5/64 inch.

To permit reaching down into

grooves and over shoulders, the tracer has no skids and the tracer point is at the bottom of a vertical extension at the end of a long beam. The tracer can be used with any profilometer amplimeter. Micrometrical Mfg. Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 4

Hopper Dump Box

. . . for roll-over dumping

A hopper-front dump box designed for compact tiering and roll-over dumping is a corrugated

12-gage steel container permitting unit-load handling and compact tiering of purchased parts or in-process material. Small quantities can be manually removed from stacked boxes through their hopper front.

Fork trucks can shift loaded boxes between storage areas and work stations. Fork slots on both sides provide for safe roll-over dumping. Four-way entry speeds handling in crowded quarters. Safe tiering is insured by two double-locking tiering angles at both rear corners and a reinforcing bar across the open front of the box. Union Metal Mfg. Co.

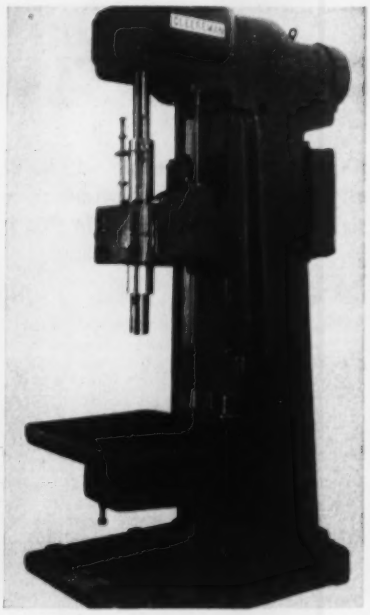
FOR MORE DATA CIRCLE REPLY CARD NO. 5

Drilling, Tapping Machine

. . . completely automatic

Model AD of the Series A upright drilling and tapping machines, performs automatic drilling; the Model ADT automatic drilling and tapping. Automatic pushbutton operation has been achieved by the application of a simple, positive design of the machine.

Both models are automatic with the cycle being controlled by dogs. They have a broad range of speeds and feeds of approximately 60 rpm to 1725 with a feed range from



boring feeds of approximately 0.003 inch per revolution to 0.250 inch per revolution. Cleereman Machine Tool Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 6

Degreasing Solvent

. . . adds balanced stabilizer

A new grade of Triclene D trichlorethylene vapor degreasing solvent has added a balanced stabilizer. The new formula provides a higher level of resistance to the deteriorating action of oils, greases and other compounds found on metal parts. Among other things, the improved Triclene D is particularly resistant to the action of aluminum or other active metals.

Improvements increase the stability of the solvent and help it retain its purity under most adverse conditions. The improvement does not involve any change in price. E. I. duPont De Nemours & Co. Inc.

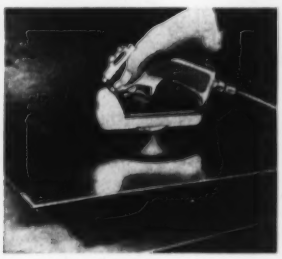
FOR MORE DATA CIRCLE REPLY CARD NO. 7

Sheet Lifter

. . . utilizes compressed air

An application of compressed air to an important production operation allows a suction cup to pull 11 pounds per square inch, as long as the trigger in the pistol grip type handle of the Pres-Vac lifter is held down.

The Pres-Vac lifter is supplied with a 5-inch neoprene cup, aluminum handle, 96-inch hose and pressure regulator. It is a complete unit ready for use. Some applications are lifting sheet steel, glass, plywood, masonite, plaster board and complete cabinets. It is also used by auto mechanics



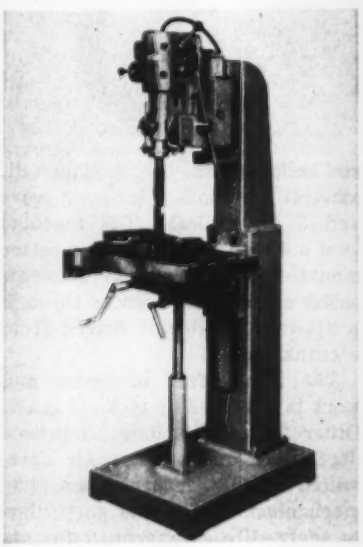
for body repair work, straightening out dents, etc. Air Division, F. J. Littell Machine Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 8

Box Column Drill

. . . handles large workpieces

A box-column drill with 30-inch swing, a drilling capacity up to 1½ inches in cast iron, 1¼ inches in mild steel is ruggedly constructed



for the handling of large, heavy workpieces. It incorporates a completely geared drive for ample transmission of power at any of the eight spindle speeds from 125 to 1540 rpm.

Other features include instant speed selection, without stopping

IT TAKES MORE THAN THESE

...to build a bridge

IT TAKES MORE THAN THESE

...to heat treat metals

BOTH MUST HAVE THE VITAL INGREDIENTS — SKILL AND EXPERIENCE

It is a sad fact that many skilled production men and managers have been, in recent years, badly misled into believing that given a furnace — a quench tank — a salt bath, and a corner of floor space — they can promptly and easily fulfill their heat treating requirements. Aggressive and misleading selling by some furnace and equipment manufacturers (fortunately only a small minority) has encouraged this misconception that equipment and materials alone are the essential factors in heat treating operations.

The cold fact is, that without the proper combination of human operational skill and technical knowledge developed over **years** of practical experience, even the best, most mechanical, most modern heat treating equipment becomes a potent menace to your product and your profit margin.

Careful evaluation of **all** the factors involved in any heat treating operation — large or small — always reveals that TECHNICAL SKILL BORN OF EXPERIENCE tops the list.

Make it head **your** list when you are analyzing the pros and cons of the question "Shall we do our own heat treating?" Write for a useful folder — "Facts and Figures on Heat Treating Costs".

THERE'S A HEAT TREATING SPECIALIST NEAR YOUR PLANT

Ace Heat Treating Company
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Anderson Steel Treating Co.
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Metallurgical, Inc.
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New England Metallurgical Corp.
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Pittsburgh 1, Pennsylvania

The Queen City Steel Treating Co.
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J. W. Rex Company
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Stanley P. Rockwell Company
Hartford 5, Connecticut

C. U. Scott & Son, Inc.
(Stainless Steels)
Rock Island, Illinois

Southern Metal Treating Co., Inc.
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Syracuse Heat Treating Corp.
Syracuse, New York

Winton Heat Treating Company
Cleveland 16, Ohio

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HERESITE

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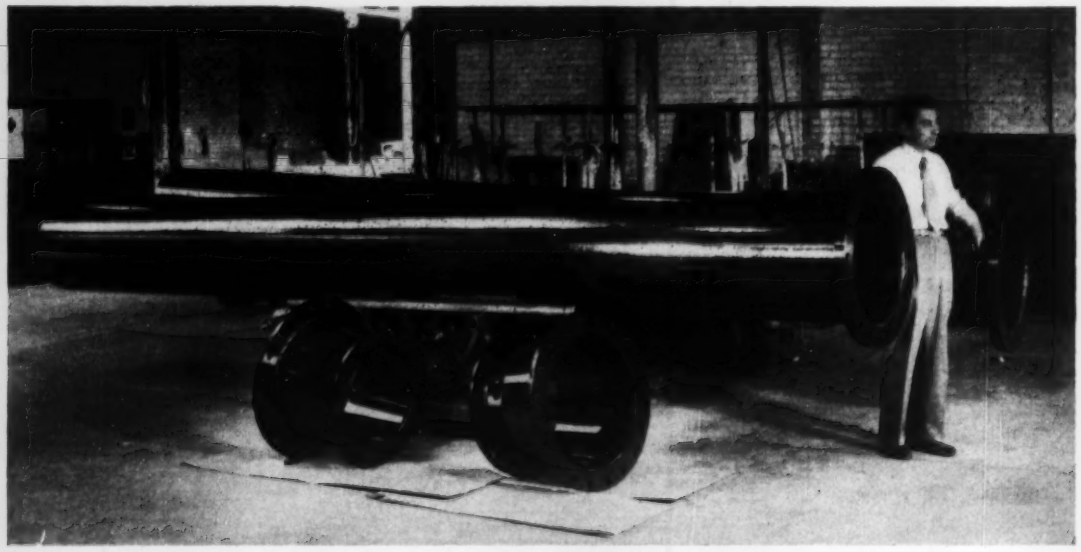
Baking Type **PHENOLIC OIL FREE COATINGS** **Self-Curing Type**

Innumerable applications of HERESITE will testify to the protection against practically all metal corroding substances as well as assuring production free of metal contamination. In most cases continuous operating temperatures of 400° F. have no effect on HERESITE baking type coatings. The exceptional high resistance and ability to withstand thermal-shock, vibration and elevated temperature make HERESITE coatings ideal for applications to various equipment.



Illustrated above are 24" dia. x 20' long HERESITE processed pipe which are to be placed in underground service.

HERECROL

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Our SYNTHETIC RUBBER available in SHEET FORM and as a LIQUID COATING for protection of steel.

HERESITE & CHEMICAL COMPANY

MANITOWOC, WISCONSIN

Branch office: 327 South LaSalle Street, Chicago, Illinois

the motor and an automatic drill ejector for quick tool changes. The motor, spindle assembly and table adjustment mechanism are of ball bearing construction. Combined spindle travel and vertical adjustment of head are 8½ inches, maximum distance spindle to table 28 inches, minimum distance spindle to table 3½ inches. The spindle taper is No. 3 Morse. I. O. Johansson Co.

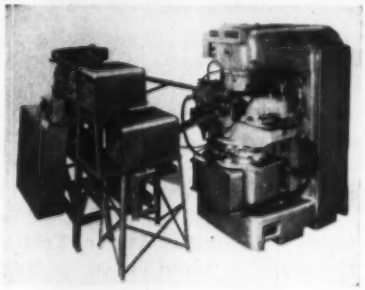
FOR MORE DATA CIRCLE RTPLY CARD NO. 9

Gear Production Concept

. . . with fully automatic gages

An automated gear production concept has been applied to a Red Ring gear shaving machine which includes vibrating hopper and straight-line feeder, automatic in and out gages, an automatic loader, a standard diagonal-type Red Ring rotary gear shaving machine and a discharge belt conveyor.

The fully automatic gages shut down the machine if it receives



or produces too many reject parts. Signal lights on these devices tell the setup man quickly what is wrong and thus cut machine down time to a minimum. The entire unit occupies a floor space about 8 x 9½ feet. It can be altered at either end to utilize a variety of work feed devices. National Broach & Machine Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 10

Plasti-Ring

. . . offers holding power

Easier, more economical application with positive holding power are primary advantages claimed for the Plasti-Ring developed by the Shakeproof Division. It provides greater retaining power at lower cost and can frequently be substituted for such articles as cotter pins, nuts, split rings, snap rings, etc.

The ring is merely slipped over the pin post, axle or shaft and

seated in a groove. Because of its contractile characteristics it will hold securely. Thus threads, holes, slots and the like are eliminated, reducing manufacturing cost considerably. Illinois Tool Works.

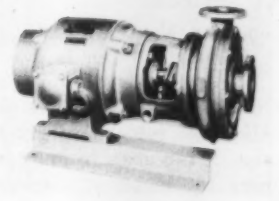
FOR MORE DATA CIRCLE REPLY CARD NO. 11

Centrifugal Pump

. . . adjustable to requirements

A series of production-built centrifugal pumps adaptable to almost any special customer requirements is announced by Ampco. These 170-rpm single suction pumps are available in sizes ranging from fractional flow to 600 gpm.

Units are available from stock constructed entirely from Ampco alloys or nickel chrome alloys to combat the effects of corrosion and erosion. They are particularly designed to transfer liquids that



are normally difficult to handle because of their erosive and corrosive nature. Parts may be interchanged to fit specialized jobs. Ampco Metal Inc.

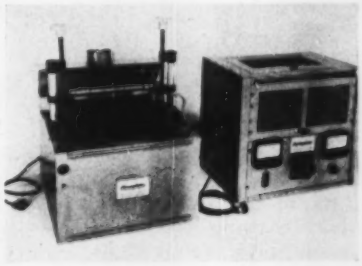
FOR MORE DATA CIRCLE REPLY CARD NO. 12

Chrome Plating Unit

. . . has new type rectifier

Designed for a range of applications with smaller components and tools, the model 75 Chromplater will deposit a bright, hard chrome plate 0.002 inch per hour on areas up to 25 sq in. Plating solution utilized eliminates the necessity of bath adjustment or maintenance throughout the life of the solution.

A newly designed rectifier embodies all the necessary plating controls. It contains a 13 x 13 x 11 inch tank, exhaust hood, adjustable work platform and thermostatically-controlled electric heater to maintain bath at efficient temperature. All types of metal may



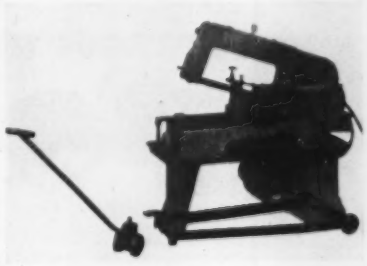
be plated, including sintered carbides and aluminum. Dawson Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 13

Portable Lift Truck

. . . in made-to-order sizes

Peerless has announced addition of a portable truck to their line. Although designed especially for the 6-inch Speedy-Cut metal sawing machine, the T-56 can be made



in various sizes on special order. The T-56 was designed to make small hack saws portable for maximum plant efficiency. Peerless Machine Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 14

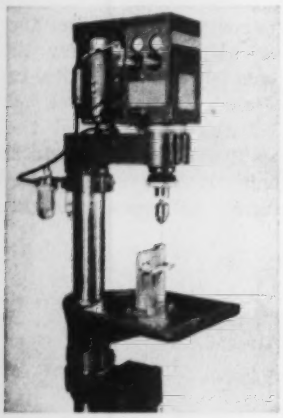
Automatic Drill Unit

. . . has repeat cycle timer

The Series 24 automatic drill unit is equipped with repeat cycle timer attachment for deep hole drilling. Combination of timer and drill unit makes a low cost automatic deep hole drilling machine. Timer electronically withdraws

drill at set intervals to clear chips.

A rotary table offers many set-up possibilities particularly on small



part drilling and tapping operations. Fixtures can be permanently mounted to table and used as required. Dumore Co. Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 15

Rigid Rib Press

. . . has interchangeable parts

Four and five-ton rigid bench type rib presses are so designed to give the ultimate in rigidity and strength for the weight of the press. The crankshaft is a solid, one-piece alloyed steel, heat-treated and precision ground. Model 4R, 4 ton has a 55-pound flywheel, roll-

er bearing mounted. The model 5R, 5 ton is a variable speed press with speeds from 90 to 285. It has a 130-pound, 18-inch diameter flywheel mounted on double roller bearing.

Tonnage is rated at 1 inch stroke. All parts are interchangeable and made extra heavy for long life. Kenco Mfg. Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 16

FREE LITERATURE

Catalogs and Clip Sheets

Reply card on page 129 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue.

Truck Cranes

Pitman Mfg. Co.—The Model 80 Pitman crane is described in detail in an 8-page, illustrated catalog. Specifications and capacities are included. Another 8-page, illustrated catalog is devoted to a description of the Pitman Hydra-Lift. How it works, how others are using it, how it is installed and dimensional drawings are given.

FOR A FREE COPY CIRCLE REPLY CARD NO. 17

Electric Measurement

Consolidated Engineering Corp. —An 11-page catalog is devoted to a discussion of the model 21-610 mass spectrometer. How it works, process monitoring and control, basic instrument, versatility and performance characteristics are covered. Specifications and standard features are contained in this illustrated catalog.

FOR A FREE COPY CIRCLE REPLY CARD NO. 18

Industrial Fans

Robinson Ventilating Co.—The type J industrial fan is described in a 44-page bulletin. Construction and classes of the fans are included. Capacity tables are given for a range of fan sizes from 12 inches through 132 inches in diameter. A performance curve indicates general operating characteristics.

FOR A FREE COPY CIRCLE REPLY CARD NO. 19

Truck Maintenance

Elwell Parker Electric Co. — "Preventive Maintenance for Industrial Trucks" details many requirements of proper preventive maintenance program for industrial vehicles. Importance of good lubricants and correct lubrication and principal causes of equipment failures and breakdown plus several maintenance forms used by Elwell are outlined.

FOR A FREE COPY CIRCLE REPLY CARD NO. 20

Alloy Steel

Jones & Laughlin Steel Corp.—A leaflet on Jalloy, Grade 3, a special alloy steel for heavy duty use, outlines the properties, composition, applications, case histories and information on heat treatment of this steel for optimum results.

FOR A FREE COPY CIRCLE REPLY CARD NO. 21

Tool Steel Tubing

Superior Tube Co.—Data Memorandum No. 14 treats two grades of tool steel, AISI E-52100 alloy steel and AISI E-1095 high carbon steel, which are produced in small-diameter tubing form. Recommended heat treatment, chemical composition, mechanical properties, production limits, tolerances and application information are given.

FOR A FREE COPY CIRCLE REPLY CARD NO. 22

Snow Melting

A. M. Byers Co.—"How Snow Melting Combats Winter Traffic Problems" is based on an analysis of snow-melting systems in which heated water mixed with antifreeze is circulated through wrought iron pipe coils or grids embedded in paved roadways.

FOR A FREE COPY CIRCLE REPLY CARD NO. 23

Copper Strip

American Silver Co. Inc.—Industrial Division offers a 4-page bulletin which covers principal beryllium copper alloys. Basic information is provided for those who have never worked with this copper. Mill limits to which the strip is produced, charts and graphs describe engineering properties and metal tempers.

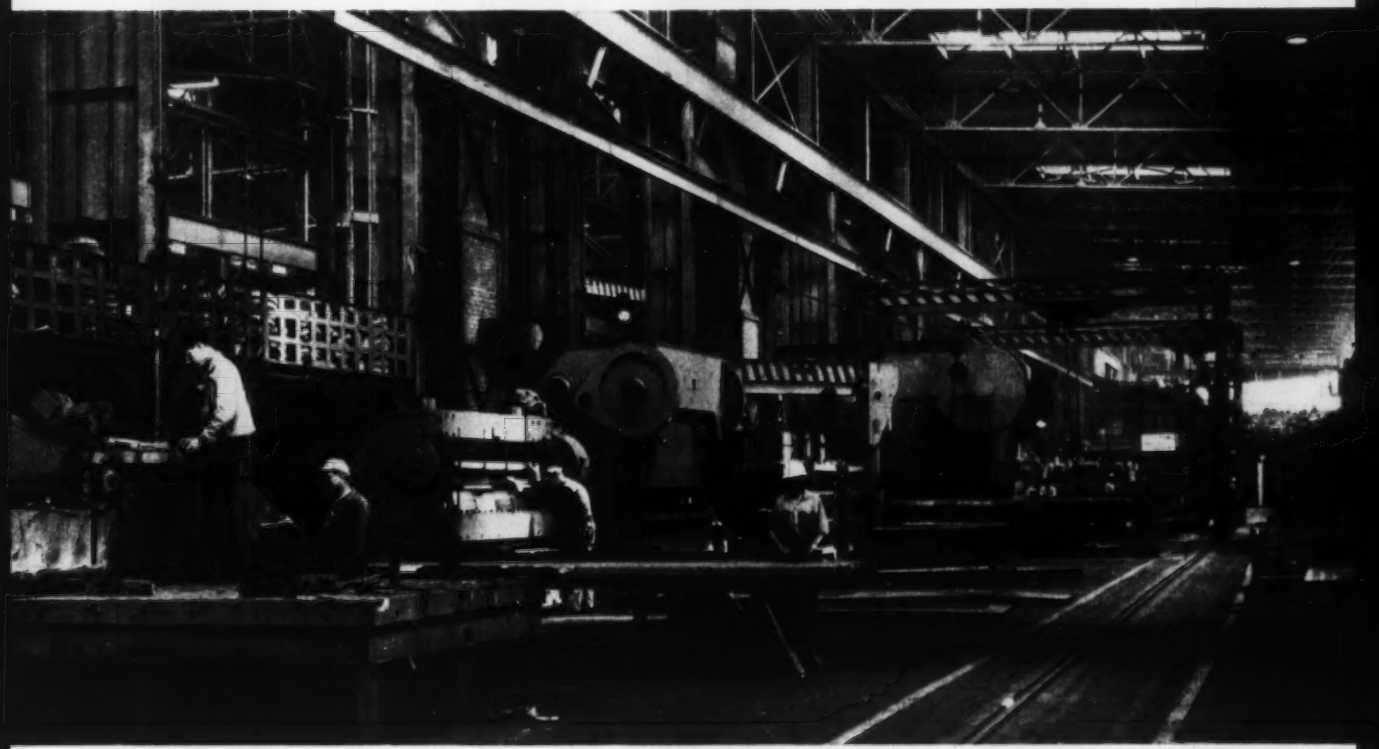
FOR A FREE COPY CIRCLE REPLY CARD NO. 24

Broaching Equipment

Colonial Broach Co.—"Chips Tell the Story," a 12-page booklet, tells

CONTINENTAL

WELDMENT FACILITIES TO SERVE ALL INDUSTRIES



Looking for Better, More Economical Weldments?

Here you can get them. Here men know how to work with metals. How to cut, shape, weld, heat-treat and machine the most complex assemblies. They have learned by producing thousands of varied weldments for machinery builders and other industrial users . . . by building rolling mills and special machinery bearing the Continental name . . . by wartime production of welded tank components and armor. They have tools—the steel fabricating bay is shown—to cut costs. They work under scientific quality control—from production of needed castings to finished assembly. Call in a Continental engineer to help you find better, more economical weldments for your production needs.

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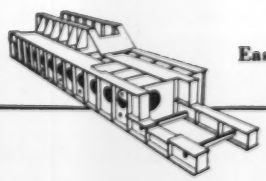

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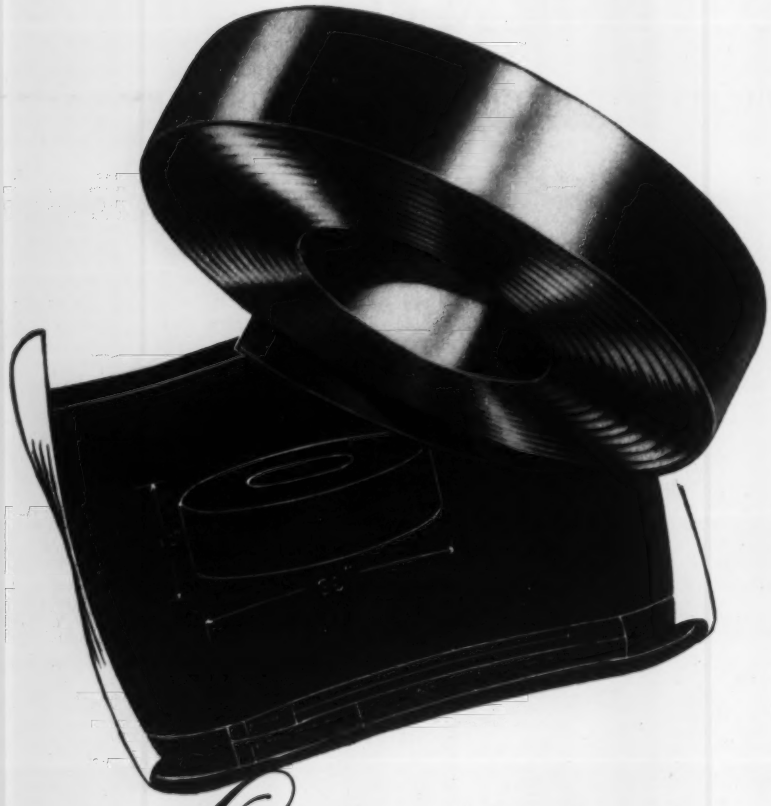

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FOLLANSBEE METAL WAREHOUSES

Pittsburgh, Pa. Rochester, N.Y. Wallingford, Conn.

why and how broaching and broaching equipment are capable of producing parts so accurately and at such high rates of speed. Bulletin C-54 carries through the theme of producing metal chips by the broaching process with enlightening comparison drawn between the cutting action of single and multiple-point tools and broaching tools.

FOR A FREE COPY CIRCLE REPLY CARD NO. 25

Powder Metallurgy

National Radiator Co.—Bulletin No. 1, issued by the Plastic Metals Division, provides a brief introduction to the art of powder metallurgy. In addition it describes the general types of metal powder offered by Plastic Metals and stresses the large number of grades required for different applications. Included are references to some of the other major uses for metal powders.

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Cutting Steel

Joseph T. Ryerson & Son Inc.—Ledloy, said to be the fastest cutting steel ever made, is described in a bulletin which gives chemical composition, mechanical properties and case studies showing production increases up to 72 per cent when this steel was used. Effect of lead addition on machinability, finish, fabrication, heat treatment and life of cutting tools is explained.

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Flatting Agents

Johns-Manville Corp. — "Celite Flatting Agents and Pigment Extenders" covers general advantages of Celite diatomite products, then gives detailed information on their use in nine basic types of finishes, with one or more typical formulations for each.

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Flute Grinding

Edward Blake Co.—An 8-page bulletin shows how the Blake flute grinder operates to save in tap costs and to make sure of uniform tapped holes. Construction features of the grinder are illustrated and complete statement of specifications includes listing of optional extras along with standard equipment.

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USE A CARD

FREE CATALOGS and LITERATURE

NEW PRODUCT INFORMATION

INFORMATION ON ADVERTISED PRODUCTS

FREE EDITORIAL CLIP SHEETS

Crank Presses

E. W. Bliss Co.—Straight side single crank presses are described and illustrated in a 20-page, two-color bulletin. Catalog 9-D illustrates various S-1 presses with capacities ranging from 50 to 400 tons. It lists detailed specifications and dimensions and also describes several types of Bliss clutches.

FOR A FREE COPY CIRCLE REPLY CARD NO. 30

Metal Cleaning Equipment

Golden-Anderson Valve Specialty Co.—Their cushioned Flowtrol valve is fully described in an 8-page technical bulletin. Installation procedure, construction, dimensions and specifications are given, supplemented with diagrams.

FOR A FREE COPY CIRCLE REPLY CARD NO. 31

Bushings Hubs, Adapters

Dodge Mfg. Corp. — Taper-lock bushings, hubs and adapters are discussed in an 8-page bulletin. Information is mostly in tabular form. Included are cross section drawings, bushing numbers, bore sizes, dimensions, weights, keyseats and list prices.

FOR A FREE COPY CIRCLE REPLY CARD NO. 32

Gaging Equipment

Cleveland Instrument Co. — A comprehensive 12-page illustrated booklet on Cleveland electronic gaging equipment for dimensional inspection and control applications in tool rooms, gage rooms and production departments is announced by Cleveland. The bulletin tells what the equipment consists of and describes how the units work together.

FOR A FREE COPY CIRCLE REPLY CARD NO. 33

Mechanical Drive Turbines

General Electric Co.—Type DP mechanical-drive turbines rated from 10 to 1200 hp and 1000 to 6500 rpm are described in the revised bulletin GEA-4955B. Special design features as well as applications for pumps, compressors, fans, blowers and similar equipment are covered.

FOR A FREE COPY CIRCLE REPLY CARD NO. 34

Controlled Quality Carbide

Newcomer Products Inc.—General catalog covers the complete line of Newcomer's products. In six sections, its 34 pages cover standard carbide blanks, standard carbide tools, boring and roller-turner tools, Econo-clamp tool holders, Ad-clamp tool holders-blanks, and conclude with a technical data section.

FOR A FREE COPY CIRCLE REPLY CARD NO. 35

Catalytic Purifiers

Oxy-Catalyst Inc. — OCM catalytic exhausts for removing harmful exhaust fumes from internal combustion engines in both industrial and commercial equipment are described in a 4-page folder. Types of equipment which can benefit from these exhausts and some examples are listed.

FOR A FREE COPY CIRCLE REPLY CARD NO. 36

Weldless Chain

McKay Co. — Bulletin D details the various types of link construction used in the making of weldless chains and covers uses of these chains. It gives complete descriptions, types of links, link materials, standard finishes, standard packing and other useful data, including applications on the ten basic types of weldless chain.

FOR A FREE COPY CIRCLE REPLY CARD NO. 37

Metal Cleaning

Graymills Corp.—A cold solvent type metal cleaning equipment catalog is offered by Graymills. At-

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8	18	28	38	48	58	68	78	88
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tention is called to their new product 606, a new carburetor and metal cleaner. Agitor construction features are outlined. Agitene solvent described.

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Special Fasteners

National Screw & Mfg. Co.—Typical products of modern cold-heading techniques, now being employed to make a wide variety of special fasteners and small parts, are the Diesel engine push rod, flattened ball collar stud and round collar thumb screw illustrated. These and others are shown with case history briefs in a booklet covering a cross section of National's experience in designing and making specials.

FOR A FREE COPY CIRCLE REPLY CARD NO. 39

Flange Surface Finishes

Johns-Manville Corp. — "How Flange Surface Finishes Affect Gasket Sealability and Joint Performance" is the latest in a series of illustrated technical bulletins. The bulletin discusses the effect of flange surface finishes upon performance.

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Anchoring Non-Moving Parts

Cerro dePasco Corp.—An illustrated technical bulletin, "Anchoring bearings, Bushings & Nonmoving Parts in Machines" contains information on this significant subject. It's well illustrated with photos and drawings.

FOR A FREE COPY CIRCLE REPLY CARD NO. 41

Fluorescent Guide

Sylvania Electric Products Inc.—"Fluorescent Guide," written in nontechnical language, presents a compendium of information on this type of lighting. Prepared as an informative reference digest it assists the buyer to purchase more intelligently and the salesman to sell more effectively.

FOR A FREE COPY CIRCLE REPLY CARD NO. 42

Aluminum Castings

Aluminum Alloys Corp.—A brochure offered illustrates their complete facilities for the production of porosity-free aluminum castings. Beginning with the aluminum ingot, every step through shipment of finished castings is illustrated by series-type photos contained in 16 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 43

Runway Rails

L. B. Foster Co.—Specifications and other engineering data on crane runway rails and accessories are included in a report published by Foster. Crane rails, angle bars and crane stops are among the accessories described.

FOR A FREE COPY CIRCLE REPLY CARD NO. 44

EDITORIAL REPRINTS:

Factors in Plant Location

What factors should be considered when a company wants to relocate or build a new plant? General Electric Co. picked Louisville for its new Appliance Park. For a look at what's sparking Louisville's industrial growth, read page 63.

FOR A FREE COPY CIRCLE REPLY CARD NO. 45

Carbide Grinding

Proportionate to expanded carbide application is the growing demand for diamond grinding. But indications are that we have reached, or are about to reach, the peak of the diamond supply. Now what? Some suggestions are included in the article on p. 92.

FOR A FREE COPY CIRCLE REPLY CARD NO. 46

Aluminum Specs

Aluminum will soon be ordered using the same alloy number from all suppliers. On page 94, you'll find an explanation of what's been done. A table gives chemical composition limits for wrought aluminum alloys. The basis for the new system is a four-digit number, the last two digits of which are the same as the old number.

FOR A FREE COPY CIRCLE REPLY CARD NO. 47

Case Hardening Steel

Nitrides formed in the case give high hardness and wear resistance with minimum distortion, says Dr. Allen Gray in his article on page 96. Hardness holds on at elevated temperature. Fatigue resistance and anti-galling are good. Here's a discussion of case hardening steel by nitriding.

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Market Outlook

DON'T LET today's easy steel procurement lull you into a squeeze this coming fall. Right now you can get all the steel you want, but deliveries could be less prompt in October.

The largest single user of steel, the automobile industry, is poised for heavy production starting in November after model changeovers. This would mean that steel would have to start flowing into the auto producers and their suppliers in October. Orders for October deliveries would start coming out next month. A substantial increase in steel buying by the auto industry might easily lengthen delivery times on some forms of finished steel several weeks.

GEARING UP—For December, auto production is being geared for near-capacity rates. This would mean an all-time peak for that period. Heretofore, December has been marred by model changeovers and factory shutdowns.

Right now, the booming construction industry is a big support to steel demand. By late this year it may have some company. In addition to projected strengthening of demand from the automobile industry there may be substantial orders from railroad carbuilders and shipbuilders. Ordering of railroad cars has picked up. Notable is one order for 1000 box cars. Several ships for the Navy have been ordered, and part of the hull steel for them will be bought in the fourth quarter.

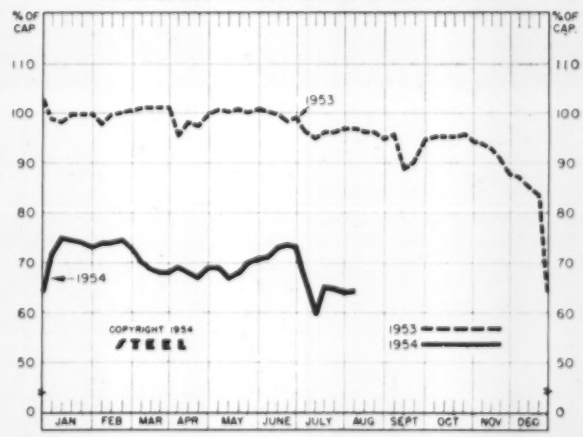
VACATIONING—Meanwhile, the summer lull resulting from vacations and slowdowns preparatory to auto model changeovers is holding a third of the nation's steel ingot capacity out of use. However, ingot production inched up half a point in the week ended Aug. 8 to 64.5 per cent of capacity.

CLOSED SHOP—In the New England district where the latest week's ingot production rate fell 10 points to 45 per cent of capacity, the major producer, U. S. Steel Corp.'s American Steel & Wire Division, is abandoning its ingot-making capacity of 287,000 tons at Worcester, Mass. Ingots have been produced there since 1901. The division's finishing operations will remain. Semifinished steel for them will be supplied by U. S. Steel's Fairless Works in eastern Pennsylvania. Closing of Worcester's four open hearths removes New England's largest user of steel scrap and pig iron.

EFFECT FROM ABROAD—While the current demand for steel remains slow in the United States, demand is rising in foreign countries, notably European. This is prompting foreign producers of steel to look to the U. S. for scrap, a raw material for steelmaking. On the East Coast where this export demand for scrap is felt, scrap prices rose slightly as a result. This lifted STEEL's price composite on steelmaking scrap $1.17 over the preceding week to $28.50 a gross ton, highest since the week ended June 2.

PRICES RISE—Steel price increases stemming from the wage raise given the steelworkers continue to come out from small producers following the pattern set several weeks ago by the large producers. As a result, STEEL's latest price composite on finished steel is $117.64 a net ton, compared with a revised figure of $117.39 a net ton for the preceding week.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended Aug. 8	Change	Same Week 1953	Same Week 1952
Pittsburgh	63	+ 3*	95	85
Chicago	69.5	+ 3*	98.5	90
Mid-Atlantic	57	0	96.5	80
Youngstown	65	+ 1	106	90
Wheeling	78	+ 2	97	63.5
Cleveland	58.5	— 6.5*	104	99
Buffalo	56	0	106.5	106.5
Birmingham	75	0	95.5	87
New England	45	—10	90	75
Cincinnati	57.5	+ 2.5	88.5	45
St. Louis	47.5	0	103	99
Detroit	56.5	+ 2	106	108
Western	82	0	101	78
National Rate	64.5	+ 0.5	96.5	89

INGOT PRODUCTION‡

	Week Ended Aug. 8	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	96.1†	95.4	89	131.9
NET TONS (In thousands)	1,544†	1,532	1,430	2,119

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,384,549 in 1954; 2,254,459 in 1953; 2,077,040 in 1952.

The Metalworking Outlook—p. 45 Technical Outlook—p. 91

PRICE INDEXES AND COMPOSITES

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics) Week Ended Aug. 3

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.525	Bars, H.R., alloy	8.783	Strip, C.R., stainless, 430 (lb)	$0.415	Tin plate, hot-dipped, 1.25 lb	$8.433
Rails, light, 40 lb	5.917	Bars, H.R., stainless, 303 (lb)	0.418	Strip, H.R., carbon	5.088	Tin plate, electrolytic, 0.25 lb	7.133
Tie Plates	5.275	Bars, H.R., carbon	5.023	Pipe, black, buttweld (100 ft)	15.000	Black plate, can making quality	6.233
Axles, railway	7.500	Bars, reinforcing	5.058	Pipe, galv., buttweld (100 ft)	18.310	Wire, drawn, carbon	7.938
Wheels, freight car, 33 in. (per wheel)	48.500	Bars, C.F., carbon	8.174	Pipe line (100 ft)	146.804	Wire, drawn, stainless, 430 (lb)	0.545
Plates, carbon	4.675	Bars, C.F., alloy	11.285	Casing, oil well, carbon (100 ft)	154.216	Bale ties (bundle)	5.860
Structural Shapes	4.517	Bars, C.F., stainless, 302 (lb)	0.433	Casing, oil well, alloy (100 ft)	227.875	Nails, wire, 8d common	7.815
Bars, tool steel, carbon (lb)	0.430	Sheets, H.R., carbon	4.880	Tubes, boiler (100 ft)	‡	Wire, barbed (80-rod spool)	7.109
Bars, tool steel, alloy, oil hardening die (lb)	0.525	Sheets, C.R., carbon	5.871	Tubing, mechanical, carbon	‡	Woven wire fence (20-rod roll)	16.815
Bars, tool steel, H.R., alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.115	Sheets, galvanized	7.140	Tubing, mechanical, stainless, 304 (100 ft)	161.193	‡ Not available.	
Bars, tool steel, H.R., alloy, high speed W 18, Cr 4, V 1 (lb)	1.610	Sheets, C.R., stainless, 302 (lb)	0.548				
		Sheets, electrical	9.350				
		Strip, C.R., carbon	7.507				

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Aug. 3 1954	July 27 1954	Month Ago	July Average
(1947-1949=100)	144.5	144.5	140.9	144.5

STEEL's FINISHED STEEL PRICE INDEX*

	Aug. 4 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	194.19	194.19†	194.19†	189.38	152.90
Index in cents per lb.	5.261†	5.261†	5.261†	5.130	4.142

STEEL's ARITHMETICAL PRICE COMPOSITES

	Aug. 4 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Finished Steel, NT*	$117.64	$117.39†	$117.39	$115.56	$91.82
No. 2 Fdry, Pig Iron, GT	56.54	56.54	56.54	56.54	46.07
Basic Pig Iron, GT	56.04	56.04	56.04	56.04	45.60
Malleable Pig Iron, GT	57.27	57.27	57.27	57.27	47.27
Steelmaking Scrap, GT	28.50	27.33	27.33	44.08	19.34

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.
†Revised

COMPARISON OF PRICES

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Aug. 4 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.30	4.30	4.30	4.15	3.35
Bars, H.R., Chicago	4.30	4.30	4.30	4.15	3.35
Bars, H.R., del. Philadelphia	4.55	4.55	4.55	5.302	3.816
Bars, C.F., Pittsburgh	5.40	5.40	5.40	5.20	3.95
Shapes, Std., Pittsburgh	4.25	4.25	4.25	4.10	3.25
Shapes, Std., Chicago	4.25	4.25	4.25	4.10	3.25
Shapes, del., Philadelphia	4.53	4.53	4.53	4.38	3.492
Plates, Pittsburgh	4.225	4.225	4.225	4.10	3.40
Plates, Chicago	4.225	4.225	4.225	4.10	3.40
Plates, Coatesville, Pa.	4.225	4.225	4.225	4.35	3.50
Plates, Sparrows Point, Md.	4.225	4.225	4.225	4.10	3.40
Plates, Claymont, Del.	4.225	4.225	4.225	4.55	3.50
Sheets, H.R., Pittsburgh	4.05	4.05	4.05	3.925	3.25
Sheets, H.R., Chicago	4.05	4.05	4.05	3.925	3.25
Sheets, C.R., Pittsburgh	4.95	4.95	4.95	4.775	4.00
Sheets, C.R., Chicago	4.95	4.95	4.95	4.775	4.00
Sheets, C.R., Detroit	5.10	5.10	5.10	4.975	4.20
Sheets, Galv., Pittsburgh	5.45	5.45	5.45	5.275	4.40
Strip, H.R., Pitts.	4.05	4.05	4.05	4.025	3.25
Strip, H.R., Chicago	4.05	4.05	4.05	3.925	3.25
Strip, C.R., Pittsburgh	5.75	5.75	5.75	5.45-5.95	4.375
Strip, C.R., Chicago	6.00	6.00	6.00	5.70	4.00
Strip, C.R., Detroit	5.60-5.90	5.60-5.90	5.60-5.90	5.45-6.05	4.20
Wire, Basic, Pitts.	5.75	5.75	5.75	5.475-5.525	4.15
Nails, Wire, Pittsburgh	6.85	6.85	6.85	6.35-6.55	5.15
Tin plate (1.50 lb), box, Pitts.	$8.95	$8.95	$8.95	$8.95	$7.75
SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$78.00	$78.00	$78.00	$75.50	$61.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	4.675	4.675	4.675	4.525	3.40

PIG IRON, Gross Ton	Aug. 4 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$57.00	$57.00	$57.00	$57.00	$47.00
Basic, Valley	56.00	56.00	56.00	56.00	46.00
Basic, deld. Phila.	59.66	59.66	59.66	60.75	49.39
No. 2 Fdry, Pitts.	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Valley	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, del. Phila.	60.16	60.16	60.16	61.25	49.89
No. 2 Fdry, Birm.	52.88	52.88	52.88	52.88	39.38
No. 2 Fdry (Birm.) del. Cin.	60.43	60.43	60.43	60.43	45.43
Malleable, Valley	56.50	56.50	56.50	56.50	46.50
Malleable, Chicago	56.50	56.50	56.50	56.50	46.50
Ferromanganese, Duquesne	200.00†	200.00†	200.00†	200.00†	175.00*

*75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$29.50	$28.50	$28.50	$44.50	$21.00
No. 1 Heavy Melt, E. Pa.	26.00	24.50	23.00	44.25	17.50
No. 1 Heavy Melt, Chicago	30.00	29.00	30.50	43.50	19.50
No. 1 Heavy Melt, Valley	29.50	26.50	27.50	45.50	18.50
No. 1 Heavy Melt, Cleve.	27.50	24.50	25.50	45.50	15.00
No. 1 Heavy Melt, Buffalo	26.50	26.50	25.50	43.75	20.25
Rails, Rerolling, Chicago	44.50	43.50	42.50	56.00	27.75
No. 1 Cast, Chicago	35.50	35.50	36.00	42.00	29.50

COKE, Net Ton

Beehive, Furn, Connlsvl.	$14.75	$14.75	$14.75	$14.75	$13.25
Beehive, Fdry, Connlsvl.	16.75	16.75	16.75	16.75	15.75
Oven Fdry, Chicago	24.50	24.50	24.50	24.50	20.00

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 22.20, pigs 20.50 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 24; No. 13, 5% Si, 28.8; No. 142, 4% Cu, 25.1; No. 195, 4.5% Cu, 0.8% Si, 24.4; No. 214, 3.8% Mg, 25.1; No. 356, 7% Si, 0.3% Mg, 23.9.

Antimony: R.M.M. brand, 99.5% 28.50. Lone Star brand, 29.00, f.o.b. Laredo, Texas, in bulk. Foreign brands, 99.5%, 27.50-28.00 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb del.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg; $2.62 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 30.00 del. Conn. Valley, 30.00 del. Midwest; Lake 30.00 del; Fire refined 29.75 del.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $145-$150 per troy oz.

Lead: Common 13.80, chemical 13.90, corroding 13.90, St. Louis; N.Y. basis, add 0.20.

Lithium: 98%, $11-$14 per lb, depending on quantity.

Magnesium: 99.8%, self-palletizing pig 27.00; notched ingot 27.75, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., and Madison, Ill., add 1.20 for pig and 1.25 for ingot. Sticks; 1.3 in. diameter, 46.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, G and R 32.50; alloy M 34.50, 10,000 lb or more f.o.b. Freeport, Tex., or Madison, Ill. Add 1.20 for Port Newark, N. J.

Mercury: Open market, spot, New York, $285-$290, nom., per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3.40 per lb; pressed ingot $4.06 per lb; sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked 60.00; 25-lb pigs 62.65; "XX" nickel shot 63.65; "F" nickel shot or ingots for addition to cast iron, 60.00; prices

DAILY NONFERROUS PRICE RECORD

	Price Aug. 4	Last Change	Previous Price	July Avg.	June Avg.	Aug. 1953 Avg.
Copper	30.00	Apr. 12	29.75-30.00	30.000	30.000	29.375
Lead	13.80	June 15	14.05	13.800	13.906	13.800
Zinc	11.00	June 3	10.50	11.000	10.923	11.000
Tin	95.00	Aug. 3	95.50	96.562	94.178	80.530
Nickel	60.00	Jan. 14, 1953	56.50	60.000	60.000	60.000
Aluminum	22.20	Aug. 5, 1954	21.50	21.500	21.500	21.500
Magnesium	27.00	Mar. 9, 1953	24.50	27.000	27.000	27.000

Quotations in cents per pound based on: Copper, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Nickel, electrolytic cathodes, 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99 + %, del.; Magnesium 99.8%, Freeport, Tex.

f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $140-$150 per troy oz nom.

Palladium: $21 per troy oz.

Platinum: $84-$87 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $125 per troy oz.

Ruthenium: $75-$80 per troy oz.

Selenium: 99.5%, $5-$6 per lb.

Sodium: 16.50, carlots; 17.00 l.c.l.

Tantalum: Sheet, rod $39.00 per lb; powder $33.50 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 95.00.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.) $4.72; grade A-2 (0.5% Fe max) $4.46 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000 lb lots $4.95 per lb, f.o.b. shipping point; less than 1000 lb $5.10; 99+% hydrogen reduced, $4.65. Treated ingots $6.70.

Zinc: Prime Western 11.00, brass special 11.25, intermediate 11.50, E. St. Louis, freight allowed over 0.50 per pound. High grade 12.35, special high grade 12.50, die casting alloy ingot 15.00, del.

Zirconium: Sponge $10 per lb; powder electronics grade $15, flash grade $11.50. (Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingots: Piston Alloy 20.00-20.50; No. 12 foundry alloy (No. 2 grade) 19.25-19.75; 5% silicon alloy, 0.60 Cu max., 22.25-22.50; 13 alloy, 0.60 Cu max., 22.25-22.50; 195 alloy 21.00-21.50; 108 alloy 19.75-20.25; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 20.50-21.00; grade 2, 19.50-20.00; grade 3, 18.50-19.00; grade 4, 17.50-18.00.

Brass Ingot: Red brass, No. 115, 27.00; tin bronze No. 225, 39.00; No. 245, 33.25; high-leaded tin bronze, No. 305, 31.50; No. 1 yellow, No. 405, 23.25; manganese bronze No. 421, 26.75.

Magnesium Alloy Ingot: AZ63A, 31.50; AZ91B, 27.00; AZ91C, 31.50; AZ92A, 31.50.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.68; rod, bar, wire, $1.65.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 35.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weatherproof, 100,000 lb, 36.28; 30,000 lb, 36.53; l.c.l. 37.03. Magnet wire del., 15,000 lb or more 41.83; l.c.l. 42.58.

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more $19.00 per cwt; pipe, full coils $19.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $11; forging billets $6; hot-rolled and forged bars, $6.

ZINC

(Prices per lb c.l., f.o.b. mill) Sheets 23.00, ribbon zinc in coils, 18.50-20.50; plates 18.00-22.25.

ZIRCONIUM

Plate $27; H.R. strip $28; C. R. strip $35; forged or H.R. bars $27; wire, 0.015 in., 1 cent per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R.	86.5	67.5	92.5
Strip, C.R.	92.5	70.5	98.5
Plate, H.R.	84.5	66.5	90.5
Rod, Shapes	82.5	65.5	88.5
Seamless Tubes	115.5	100.5	137.5
Shot, Blocks	60.0		

ALUMINUM

(30,000 lb base; freight allowed over 499 lb) Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	12-49	33.9	...	...
0.135-0.096	12-48	34.4	...	...
0.095-0.077	12-48	35.1	32.7	37.5
0.076-0.061	12-48	35.7	32.9	37.7
0.060-0.048	12-48	36.1	33.2	38.1
0.047-0.038	12-48	36.6	33.6	38.4
0.037-0.030	12-48	37.0	34.0	39.1
0.029-0.024	12-48	37.6	34.3	39.8
0.023-0.019	12-36	38.3	35.1	40.4
0.018-0.017	12-36	39.1	35.7	41.3
0.016-0.015	12-36	40.0	36.5	42.5
0.014	12-24	41.0	37.5	43.8
0.013-0.012	12-24	42.1	38.2	44.8
0.011	12-24	43.1	39.4	46.4
0.010-0.0095	12-24	44.3	40.5	48.0
0.009-0.0085	12-24	45.6	41.9	50.0
0.008-0.0075	12-24	47.1	43.1	51.8
0.007	12-18	48.6	44.6	54.1
0.006	12-18	50.2	46.0	59.1

* 72-180 in. lengths. †26 in. max. dia.

ALUMINUM

Plates and Circles: Thickness 0.250-3.0 in., 24-60 in. width or dia., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
2S-F, 3S-F	32.4	36.3
50S-F	33.5	37.4
4S-F	34.5	39.1
52S-F	36.2	40.9
61S-T6	37.4	41.5
24S-T4*	39.3	45.4
75S-T6*	47.1	53.7

*24-48 in. widths or dia., 72-180 in. lengths.

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or across flats	Round 11S-T3	Round 17S-T4	Hexagonal 11S-T3	Hexagonal 17S-T4
Drawn				
0.125	59.6	57.9	...	...
0.156-0.172	50.6	48.9	...	...
0.188	50.6	48.9	...	62.4
0.219-0.234	47.9	46.2	...	...
0.250-0.281	47.9	46.2	...	59.5
0.313	47.9	46.2	...	56.8
Cold-finished				
0.375-0.531	46.6	44.9	56.2	53.4
0.563-0.688	46.6	44.9	53.4	50.2
0.750-1.000	45.5	43.8	48.9	47.3
1.063	45.5	43.8	...	45.7
1.125-1.500	43.8	42.1	47.3	45.7
Rolled				
1.563	42.7	41.0	...	...
1.625-2.000	42.1	40.4	...	44.1
2.125-2.500	41.1	39.4	...	...
2.750-3.375	39.9	38.2	...	...

ALUMINUM

Forging Stock: Round, Class 1, 43.8-34.4, in specific lengths 36-144 in., diameters 0.375-8 in.; rectangles and squares, Class 1, 50.2-38.4 in random lengths 0.375-4.0 in. thick, widths 0.750-10.0 in.

Pipe: A.S.A. Schedule 40, alloy 63S-T6, 20 ft length, plain ends, 90,000 lb base, per 100 ft.

Nom. pipe size, in.		Nom. pipe size, in.	
⅜	$15.05	2	$ 46.30
1	23.65	4	127.70
1¼	32.00	6	228.50
1½	38.25	8	343.80

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 94.00, 0.064-in. 73.00, 0.125-in. 60.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot rolled AZ31, 53.00, 20,000 lb or more 0.250-in. and over, widths to 48 in., lengths to 144 in.; raised pattern floor plate, 59.00, 20,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in., 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ⅛-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 66.20.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.38b	45.98c	....	48.44	26.000	26.000	25.250
Yellow Brass	41.72	34.50d	42.26	44.63	19.750	19.500	18.000
Red Brass, 85%	45.44	45.38	45.98	48.25	23.000	22.750	22.250
Low Brass, 80%	44.47	44.41	45.01	47.28	22.125	21.875	21.375
Naval Brass	45.76	40.07	52.82	48.92	18.250	18.000	17.500
Commercial Bronze, 90%	46.95	46.89	47.49	49.51	23.875	23.625	23.125
Nickel Silver, 10%	53.36	59.43g	57.69	....	23.625	23.375	11.813
Phosphor Bronze, A, 5%	66.58	67.06	67.06	68.23	26.125	25.875	24.875
Silicon Bronze	52.71	51.93	52.75	70.11e	25.125	24.875	24.125
Manganese Bronze	49.48	43.62	54.06	....	18.250	18.000	17.500
Muntz Metal	43.96	39.77	....	....	18.625	18.375	17.875

a. Cents per lb f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 2S clippings 13.00; low copper clippings 13.00; mixed clippings 11.00; old sheet 10.00; borings and turnings 6.00; pistons and struts 7.50; crankcases 10.00; industrial castings 10.00.

Copper and Brass: Heavy copper and wire, No. 1 24.50-25.00; No. 2 copper 23.00-23.25; light copper 21.00-21.25; No. 1 composition red brass 19.00-19.50; No. 1 composition turnings 18.50-19.00; mixed brass turnings 11.50-12.00; new brass clippings 18.00; No. 1 brass rod turnings 15.00; light brass 11.50-12.00; heavy yellow brass 14.00; new brass rod ends 16.00; auto radiators, unsweated 15.00; cocks and faucets 16.00-16.50; brass pipe 16.50-17.00.

Lead: Heavy 11.00-11.25; battery plate 5.75-6.00; linotype and stereotype 13.00; electrotype 11.50; mixed babbitt 12.00-12.50.

Magnesium: Clippings 18.50-19.50; clean castings 17.50-18.50; iron castings, not over 10% removable Fe, 16.50-17.50.

Monel: Clippings 23.00-25.00; old sheet 21.00-23.00; turnings 16.00-18.00; rods 23.00-25.00.

Nickel: Sheets and clips 60.00-65.00; rolled anodes 60.00-65.00; turnings 40.00; rod ends 60.00-65.00.

Tin: No. 1 pewter 55.00-60.00; block tin pipe 75.00-80.00; No. 1 babbitt 50.00.

Zinc: Old zinc, 4.75-5.00; new die cast scrap, 4.50-4.75; old die cast scrap, 3.00-3.25.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 2S, 3S clippings 15.25-15.75; 51S, 52S clippings 15.00-15.50; 14S, 17S, 24S clippings 14.25-14.50; mixed clippings 14.00-14.50; old sheet 13.00-13.50; old cast 13.00-13.50; clean old cable, free of steel 15.00-15.50; borings and turnings 13.25-13.75.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 42.00; light scrap 37.00.

Copper Brass: No. 1 copper 27.00; No. 2 copper 25.50; light copper 24.00; refinery brass (60% copper) per dry copper content 23.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 26.75-27.00; No. 2 copper 25.00-25.25; light copper 23.50-23.75; No. 1 composition solids 21.00-21.50; heavy yellow brass solids 17.00; yellow brass turnings 16.00; radiators 17.75-18.00.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $1.70 per lb.

Copper: Flat-rolled 45.04, oval 44.54, 2000-5000 lb; electrodeposited 39.78, cast 42.04, 5000-10,000 lb lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb $1.135; 200-499 lb $1.12; 500-999 lb $1.115; 1000 lb or more $1.11.

Zinc: Bar 18.50, bar or flat top 17.50 ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100 lb drums.

Chromic Acid: Less than 10,000 lb 28.50; over 10,000 lb 27.50.

Copper Cyanide: Under 1000 lb 63.90, 1000 lb and over 61.90.

Copper Sulphate: 100-6000 lb 11.35; 6000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulphate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,000 lb 30.00; 36,000 lb and over 29.00.

Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.50; 25,000 oz and over 77.325.

Sodium Cyanide: Egg, under 1000 lb 19.80; 1000-19,900 lb 18.80; 20,000 lb and over 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb 72; 100-600 lb 57.6; 700-1900 lb 55.2; 2000-9900 lb 53.4; 10,000 lb or more 52.3.

Stannous Chloride: (Anhydrous): Less than 50 lb $1.582; 50 lb $1.242; 100-300 lb $1.092; 400-900 lb $1.068; 100-1900 lb $1.043; 2000-4900 lb $1.008; 5000-19,000 lb 94.6; 20,000 lb and over 88.5.

Stannous Sulphate: Less than 5 lb $1.281; 50 lb 98.1; 100-1900 lb 96.1; 2000 lb and over 94.1.

Zinc Cyanide: Under 1000 lb 54.30, 1000 lb and over 52.30.

Nonferrous Metals

Fabulous Kitimat aluminum project in British Columbia starts production. Eventually half the North American aluminum smelting capacity may be in Pacific Northwest

THE PACIFIC Northwest is bidding for a supremacy in aluminum smelting that could eventually bring half the North American production capacity to the area.

A major step toward the goal was climaxed last week when the first ingot was poured at Aluminum Co. of Canada's fabulous Kitimat project in British Columbia. A $275-million industrial empire carved out of the wilderness 400 miles north of Vancouver and only 100 miles below the Alaskan border, the development represents the largest hydroelectric project ever undertaken by private enterprise.

Herculean Task—In three years of work, a river was reversed by shoving 6 million tons of rock and clay into the Nechako river canyon to form Kenny dam, backing up waters into a 150-mile-long reservoir system. A 25-foot-diameter tunnel blasted 10 miles through granite brings water to the Kemano powerhouse where 150,000-horsepower impulse turbines, the world's largest, spin in a man-made cavern carved from the mountain. Adjacent to the smelter at Kitimat is a seaport to handle incoming Jamaica alumina, petroleum coke, pitch and cryolite, and for ingot to move out to the world markets.

In today's stage of development, 420,000-horsepower installed capacity feeds a smelter that will produce 91,500 tons of aluminum yearly. Even more staggering are the possibilities: Hydro capacity of 2,240,000 horsepower that will supply the largest aluminum smelter in the world capable of 550,000 tons annually.

Expansion Incentives—In the absence of an economic tailspin or marketing difficulties, all factors point to further development at Kitimat.

Power is the key to aluminum economy and hydro power is still king, despite the promise of atomic energy, natural gas and coal. The U. S. Northwest states are said to have 40 per cent of the nation's hydro potential but only 6 per cent of the installed power generating capacity.

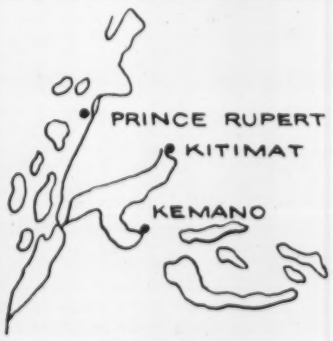
Present and Future—For an area that didn't see aluminum production until 1940, the Pacific Northwest has come a long way quickly. On the U. S. side, the area had 40 per cent of the nation's primary capacity before Korea and received 36 per cent of the new capacity scheduled. Of total North American capacity, the region has 28 per cent today and will gain to 30 per cent next year when Anaconda's 55,000-ton reduction plant in Columbia Falls, Mont., goes into operation. If Harvey Machine Co. builds its 54,000-ton facility at The Dalles, Oreg., the area would have 31 per cent of North American smelter capacity, which would be boomed to 39 per cent if Alcan pushes Kitimat to its ultimate potential.

On top of that don't forget Aluminum Co. of America's desire to construct a $400-million Taiya project near Skagway, Alaska, capable of 200,000 tons initially, that could be doubled by additional expenditure of $300 million.

If all these plans bore fruit, the Pacific Northwest could boast a shade over 50 per cent of all primary aluminum produced on the continent.

STEEL's Metal Price Averages for July, 1954
(Cents per pound)

Electrolytic Copper, del. Conn.	30.000
Lead, St. Louis	13.800
Prime Western Zinc, E. St. Louis	11.000
Straits Tin, New York	96.558
Primary Aluminum Ingots, del.	21.500
Magnesium, Freeport, Tex.	27.00
Nickel, f.o.b. refinery	60.000

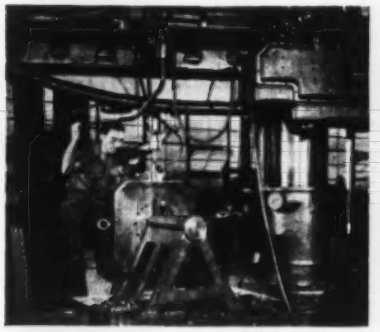


British Columbia

One of three generator rotors is lowered into place at the Kemano powerhouse in British Columbia, Canada. Power generated there last week helped produce the first ingot of aluminum at the smelters in Kitimat

Market Memos

- Wage settlement at Alcoa prompted the company to raise 99 per cent aluminum pig half cent a pound and 99 per cent ingot 7/10 cents. Other ingot grades rose 7/10 cents or more. Alcoa will adjust other products too.
- Further slippage in copper prices is making producers uneasy. Sales of Chilean copper by dealers to European consumers at prices below producers' quotations may undermine the "price date of delivery" system now prevailing.
- Price concessions are again being offered by zinc importers, with high grade and special high grade moving in greatest volume.
- National Lead Co. announced initial plans for expansion of the government-owned, company-operated nickel plant at Nicaro, Cuba. Expenditures of $43 million have been authorized to enlarge the plant by 75 per cent.



Tool steels—Widely used in everything from woodworking tools to high-speed machine tools, vanadium tool steels combine great mechanical strength with superior cutting ability. Containing extremely hard vanadium carbides, they effectively resist both wear and grain growth.

Forgings—For application under severe operating conditions in transportation and power equipment, crankshafts, gears, axles and other heavy-section parts are forged of vanadium steel. Inherently fine grained, vanadium steel has greater strength and toughness, allows a larger section-size to be fully hardened.

Plates and shapes—For high strength and superior weldability, designers of the U. S. liner, *United States*, specified hull plates of vanadium steel. Besides increasing strength and ductility, vanadium decreases any tendency toward undesirable brittleness in the welded zones even at subzero temperatures.

Castings—Crawler shoes for power shovels, bucket teeth for dredging machinery, truck frames for railway cars—all have increased strength, greater resistance to shock and fatigue when cast from vanadium steel. These castings also have excellent machining qualities and can be heat treated to a wide range of mechanical properties.

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VANCORAM VANADIUM ALLOYS

. . . there's a grade available for every vanadium steel and iron application

Iron Foundry Grade	For improvement of the physical properties of iron.
Grade A (Open Hearth)	For low-vanadium steels and vanadium cast irons.
Grade B (Crucible)	For tool steels and other high-vanadium steels requiring a limited silicon addition.
Grade C (Primes)	For making the highest vanadium and the lowest silicon addition to tool steels.
Vanadium Metal (90% Grade)	For special iron-free (non-ferrous) or low-iron alloys, or for low-impurity ferrous alloys.
Vanadium Pentoxide, Tech.	A source of vanadium in basic electric-furnace steels. A base for numerous chemical compounds.

The finest alloy steels are made with Vancoram ferro alloys.

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VANCORAM

Producers of alloys, metals and chemicals

STEEL PRICES

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on page 137. Key to footnotes, page 139

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$61.50

INGOTS, Alloy (NT)
Detroit R7 .....$63.00
Midland,Pa. C18 .....65.00
Munhall,Pa. U5 .....65.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Aliquippa,Pa. J5 ....$64.00
Bessemer,Pa. U5 .....64.00
Clairton,Pa. U5 .....64.00
Ensley,Ala. T2 .....64.00
Fairfield,Ala. T2 .....64.00
Fontana,Calif. K1 ....72.00
Gary,Ind. U5 .....64.00
Johnstown,Pa. B2 ....64.00
Lackawanna,N.Y. B2 ..64.00
Munhall,Pa. U5 .....64.00
So.Chicago,Ill. U5 ....64.00
So.Duquesne,Pa. U5 ..64.00

Carbon, Forging (NT)
Aliquippa,Pa. J5 .....$78.00
Bessemer,Pa. U5 .....78.00
Buffalo R2 .....78.00
Clairton,Pa. U5 .....78.00
Cleveland R2 .....78.00
Conshohocken,Pa. A3 ..83.00
Detroit R7 .....78.50
Ensley,Ala. T2 .....78.00
Fairfield,Ala. T2 .....78.00
Fontana,Calif. K1 ....86.00
Gary,Ind. U5 .....78.00
Geneva,Utah C11 .....78.00
Houston S5 .....85.50
Johnstown,Pa. B2 .....78.00
Lackawanna,N.Y. B2 ..78.00
LosAngeles B3 .....87.00
Munhall Pa. U5 .....78.00
Seattle B3 .....91.50
So.Chicago R2,U5,W14..78.00
So.Duquesne,Pa. U5 ..78.00
So.SanFrancisco B3 ...87.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$86.00
Buffalo R2 .....86.00
Canton,O. T7 .....86.00
Canton,O. R2 .....86.00
Conshohocken,Pa. A3 ..93.00
Detroit R7 .....84.00
Fontana,Calif. K1 ....105.00
Gary,Ind. U5 .....86.00
Houston S5 .....93.00
Ind.Harbor,Ind. Y1 ...86.00
Johnstown,Pa. B2 .....86.00
Lackawanna,N.Y. B2 ..86.00
LosAngeles B3 .....106.00
Massillon,O. R2 .....86.00
Midland,Pa. C18 .....86.00
Munhall,Pa. U5 .....86.00
So.Chicago R2,U5,W14..86.00
So.Duquesne,Pa. U5 ...86.00
Struthers,O. Y1 .....86.00
Warren,O. C17 .....86.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$96.50
Canton,O. R2 .....96.50
Cleveland R2 .....96.50
Gary,Ind. U5 .....96.50
So.Chicago R2, W14 ...96.50
So.Duquesne,Pa. U5 ...96.50

SKELP
Aliquippa,Pa. J5 .....4.00
Fontana,Calif. K1 ....4.775
Munhall,Pa. U5 .....3.90
Warren,O. R2 .....3.90
Youngstown R2, U5 ....3.90

WIRE RODS
AlabamaCity,Ala. R2 ..4.675
Aliquippa,Pa. J5 .....4.675
Alton,Ill. L1 .....4.85
Buffalo B11, W12 ....4.675
Cleveland A7 .....4.675
Donora,Pa. A7 .....4.675
Fairfield,Ala. T2 ....4.675
Fontana,Calif. K1 ....5.475
Houston S5 .....5.075
IndianaHarbor,Ind. Y1 4.675
Johnstown,Pa. B2 ....4.675
Joliet,Ill. A7 .....4.675
KansasCity,Mo. S5 ....5.015
Kokomo,Ind. C18 .....4.775
LosAngeles B3 .....5.475
Minnequa,Colo. C10 ...4.925
Monessen,Pa. P7 .....4.675
No.Tonawanda,N.Y.B11 4.525
Pittsburg,Calif. C11 ..5.325
Portsmouth P12 .....4.675
Roebling,N.J. R5 .....4.775
So.Chicago,Ill. R2 .....4.675
Sterling,Ill.(1) N15 ....4.675
Sterling,Ill. N15 .....4.775
Struthers,O. Y1 .....4.675
SparrowsPoint,Md. B2..4.775
Torrance,Calif. C11 ..5.475
Worcester,Mass. A7 ..4.975

STRUCTURALS

Carbon Steel Stand. Shapes
Aliquippa,Pa. J5 .....4.25
Bessemer,Ala. T2 .....4.25
Bethlehem,Pa. B2 .....4.30
Birmingham C15 .....4.25
Clairton,Pa. U5 .....4.25
Fairfield,Ala. T2 .....4.25
Fontana,Calif. K1 .....4.90
Gadsden,Ala.(31) R2 ..4.28
Gary,Ind. U5 .....4.25
Geneva,Utah C11 .....4.25
Houston S5 .....4.65
Ind.Harbor,Ind. I-2 ....4.25
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 ....4.85
Lackawanna,N.Y. B2 ..4.30
LosAngeles B3 .....4.95
Minnequa,Colo. C10 ....4.70
Munhall,Pa. U5 .....4.25
Niles,Calif. P1 .....4.80
Phoenixville,Pa. P4 .....3.95
Seattle B3 .....5.00
So.Chicago U5, W14....4.25
So.SanFrancisco B3 ....4.90
Torrance,Calif. C11 ....4.95
Weirton,W.Va. W6 .....4.25

Wide Flange
Bethlehem,Pa. B2 .....4.30
Clairton,Pa. U5 .....4.25
Fontana,Calif. K1 .....5.25
Lackawanna,N.Y. B2 ..4.30
Munhall,Pa. U5 .....4.25
Phoenixville,Pa. P4 .....3.95
So.Chicago,Ill. U5 .....4.25

Alloy Stand. Shapes
Clairton,Pa. U5 .....5.20
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.20
Munhall,Pa. U5 .....5.20
So.Chicago,Ill. U5 ....5.20

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 .....6.40
Bessemer,Ala. T2 .....6.40
Bethlehem,Pa. B2 .....6.45
Clairton,Pa. U5 .....6.40
Fairfield,Ala. T2 .....6.40
Fontana,Calif. K1 .....7.05
Gary,Ind. U5 .....6.40
Geneva,Utah C11 .....6.40
Ind.Harbor,Ind. I-2, Y1..6.40
Johnstown,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ..6.45
LosAngeles B3 .....7.10
Munhall,Pa. U5 .....6.40
Seattle B3 .....7.15
So.Chicago,Ill. U5, W14..6.40
So.SanFrancisco B3 ....7.05
Struthers,O. Y1 .....6.40

H.S., L. A. Wide Flange
Bethlehem,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ..6.45
Munhall,Pa. U5 .....6.40
So.Chicago,Ill. U5 .....6.40

PILING

Bearing Piles
Munhall,Pa. U5 .....4.25
So.Chicago,Ill. U5 .....4.25

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ..5.075
Lackawanna,N.Y. B2..5.075
Munhall,Pa. U5 .....5.075
So.Chicago,Ill. U5 ....5.075

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2..4.255
Aliquippa,Pa. J5 .....4.225
Ashland,Ky.(15) A10 ..4.225
Bessemer,Ala. T2 .....4.225
Buffalo(31) R2 .....4.255
Clairton,Pa. U5 .....4.225
Claymont,Del. C22 ....4.225
Chicago(31) R2 .....4.295
Cleveland J5 .....4.225
Cleveland(31) R2 .....4.285
Coatesville,Pa. L7 ....4.225
Conshohocken,Pa. A3 ..4.225
Ecorse,Mich. G5 .....4.375
Fairfield,Ala. T2 .....4.225
Gadsden,Ala.(31) R2 ..4.255
Fontana,Calif.(30) K1..4.875
Gary,Ind. U5 .....4.225
Geneva,Utah C11 .....4.225
GraniteCity,Ill. G4 ....4.425
Harrisburg,Pa. C5 .....3.975
Houston S5 .....4.625
Ind.Harbor,Ind. I-2, Y1 4.225
Johnstown,Pa. B2 .....4.225
Lackawanna,N.Y. B2..4.225
LoneStar,Tex. L6 .....4.40
Mansfield,O. E6 .....4.225
Minnequa,Colo. C10 ...5.075
Munhall,Pa. U5 .....4.225
Newport,Ky. N9 .....4.225
Pittsburgh J5 .....4.225
Riverdale,Ill. A1 .....4.225
Seattle B3 .....5.125
Sharon,Pa. S3 .....4.225
So.Chicago,Ill. R2 .....4.295
So.Chicago,Ill. U5,W14..4.225
SparrowsPoint,Md. B2 ..4.225
Steubenville,O. W10 ...4.225
Warren,O.(31) R2 .....4.265
Weirton,W.Va. W6 .....4.225
Youngstown(31) R2 ...4.275
Youngstown U5, Y1 ...4.225

PLATES, Carbon Abres. Resist.
Fontana,Calif. K1 ....6.025
Geneva,Utah C11 .....5.375

PLATES, Wrought Iron
Economy,Pa. B14 .....9.80

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.45
Bessemer,Ala. T2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland J5, R2 .....6.45
Conshohocken,Pa. A3 ..6.45
Ecorse,Mich. G5 .....6.60
Fairfield,Ala. T2 .....6.45
Fontana,Calif.(30) K1..7.15
Gary,Ind. U5 .....6.45
Geneva,Utah C11 .....6.45
Ind.Harbor,Ind. I-2, Y1.6.45
Johnstown,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ..6.45
LosAngeles B3 .....7.35
Munhall,Pa. U5 .....6.45
Pittsburgh J5 .....6.45
Seattle B3 .....7.15
Sharon,Pa. S3 .....6.45
So.Chicago,Ill. U5, W14.6.45
SparrowsPoint,Md. B2 ..6.45
Warren,O. R2 .....6.45
Youngstown U5, Y1 ....6.45

PLATES, Alloy
Claymont,Del. C22 ....5.80
Coatesville,Pa. L7 ....5.80
Fontana,Calif. K1 .....6.45
Gary,Ind. U5 .....5.80
Johnstown,Pa. B2 .....5.80
LosAngeles B3 .....6.70
Munhall,Pa. U5 .....5.80
Newport,Ky. N9 .....5.80
Sharon,Pa. S3 .....5.80
So.Chicago,Ill. U5, W14.5.80
SparrowsPoint,Md. B2 ..5.80

FLOOR PLATES
Cleveland J5 .....5.275
Conshohocken,Pa. A3..5.275
Harrisburg,Pa. C5 ....5.15
Ind.Harbor,Ind. I-2 ..5.275
Munhall,Pa. U5 .....5.275
So.Chicago,Ill. U5 ....5.275

PLATES, Ingot Iron
Ashland c.l. (15) A10..4.475
Ashland l.c.l. (15) A10.4.975
Cleveland c.l. R2 .....4.825
Warren,O. c.l. R2 .....4.825

BARS

BARS, Hot-Rolled Carbon
Aliquippa,Pa. J5 .....4.30
Alton,Ill. L1 .....4.50
Atlanta,Ga. A11 .....4.50
Bessemer,Ala. T2 .....4.30
Birmingham C15 .....4.30
Buffalo(31) R2 .....4.33
Canton,O.(31) R2 .....4.46
Chicago(31) R2 .....4.37
Clairton,Pa. U5 .....4.30
Cleveland(31) R2 .....4.36
Detroit R7 .....4.30
Ecorse,Mich. G5 .....4.45
Emeryville,Calif. J7 ....4.90
Fairfield,Ala. T2 .....4.30
Fairless,Pa. U5 .....4.45
Fontana,Calif. K1 .....5.00
Gary,Ind. U5 .....4.30
Gadsden,Ala.(31) R2 ..4.33
Houston S5 .....4.70
Ind.Harbor,Ind. I-2, Y1.4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ..4.30
LosAngeles B3 .....5.00
Massillon,O.(31) R2 ...4.46
Milton,Pa. M18 .....4.30
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....4.85
N.Tonawanda,N.Y. B11.4.30
Pittsburg,Calif. C11 ....5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
Seattle B3, N14, P23 ...5.05
So.Chicago U5, W14 ...4.30
So.Duquesne,Pa. U5 ....4.30
So.SanFran.,Calif. B3 ..5.05
Sterling,Ill.(1) N15 ....4.30
Sterling,Ill. N15 .....4.40
Struthers,O. Y1 .....4.30
Torrance,Calif. C11 ....5.00
Warren,O. R2 .....4.34
Weirton,W.Va. W6 .....4.30
Youngstown U5 .....4.30
Youngstown(31) R2 ....4.35

Bars, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....5.075
Buffalo R2 .....5.105
Canton,O. T7 .....5.075
Canton,O. R2 .....5.115
Chicago R2 .....5.145
Clairton,Pa. U5 .....5.075
Detroit R7 .....4.975
Ecorse,Mich. G5 .....5.225
Fontana,Calif. K1 ....6.125
Fairless,Pa. U5 .....5.225
Gary,Ind. U5 .....5.075
Houston S5 .....5.475
Ind.Harbor,Ind. I-2, Y1 5.075
Johnstown,Pa. B2 ....5.075
KansasCity,Mo. S5 ....5.675
Lackawanna,N.Y. B2 ..5.075
LosAngeles B3 .....6.125
Massillon,O. R2 .....5.115
Midland,Pa. C18 .....5.075
So.Chicago U5, W14 ..5.075
So.Duquesne,Pa. U5 ..5.075
Struthers,O. Y1 .....5.075
Warren,O. C17 .....5.075
Youngstown U5 .....5.075

BARS & SMALL SHAPES, H.R.
High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.45
Bessemer,Ala. T2 .....6.45
Bethlehem,Pa. B2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland R2 .....6.45
Ecorse,Mich. G5 .....6.60
Fairfield,Ala. T2 .....6.45
Fontana,Calif. K1 .....7.70
Gary,Ind. U5 .....6.45
Ind.Harb.,Ind. I-2, Y1.6.45
Johnstown,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ..6.45
LosAngeles B3 .....7.15
Pittsburgh J5 .....6.45
Seattle B3 .....7.20
So.Chicago W14 .....6.45
So.Duquesne,Pa. U5 ...6.45
So.SanFrancisco B3 ....7.20
Struthers,O. Y1 .....6.45
Youngstown U5 .....6.45

BAR SIZE ANGLES; H.R.CARBON
Bethlehem,Pa. B2 .....4.45

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....4.30
Atlanta A11 .....4.50
Fontana,Calif. K1 .....5.00
Niles,Calif. P1 .....4.85
SanFrancisco S7 .....4.70

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....5.20
Gary,Ind. U5 .....5.20
Houston S5 .....5.60
KansasCity S5 .....5.80
Youngstown U5 .....5.20

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M12 ...5.40
BeaverFalls,Pa. R2 ...5.46
Buffalo B5 .....5.45
Camden,N.J. P13 .....5.85
Carnegie,Pa. C12 .....5.40
Chicago W18 .....5.40
Cleveland A7, C20 ....5.40
Detroit P17, R7 .....5.35
Detroit B5 .....5.60
Donora,Pa. A7 .....5.40
Elyria,O. W8 .....5.40
FranklinPark,Ill. N5 ...5.40
Gary,Ind. R2 .....5.47
GreenBay,Wis. F7 .....5.40
Hammond,Ind. L2, M13.5.40
Hartford,Conn. R2 ....5.90
Harvey,Ill. B5 .....5.40
LosAngeles R2 .....6.85
LosAngeles $30 .....6.85
Mansfield,Mass. B5 ....5.95
Massillon,O. R8 .....5.40
Massillon,O. R2 .....5.44
Monaca,Pa. S17 .....5.40
Newark,N.J. W18 .....5.85
NewCastle,Pa.(17) B4 ..5.40
Pittsburgh J5 .....5.40
Plymouth,Mich. P5 ....5.45
Putnam,Conn. W18 .....5.95
Readville,Mass. C14 ....5.95
St.Louis,Mo. M5 .....5.70
So.Chicago,Ill. W14 ....5.40
SpringCity,Pa. K3 .....5.85
Struthers,O. Y1 .....5.40
Waukegan,Ill. A7 .....5.40
Worcester,Mass. W19 ...6.10
Youngstown F3, Y1 ....5.40

BARS, Cold-Finished Alloy
(Turned and Ground)
Cumberland,Md.(5) C19 4.65

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 .....6.625
BeaverFalls,Pa. M12 ..6.625
BeaverFalls,Pa. R2 ...6.685
Bethlehem,Pa. B2 .....6.625
Buffalo B5 .....6.625
Camden,N.J. P13 .....6.80
Canton,O. T7 .....6.625
Carnegie,Pa. C12 .....6.625
Chicago W18 .....6.325
Cleveland A7, C20 ....6.625
Detroit R7 .....6.425
Detroit P17 .....6.475
Detroit B5 .....6.525
Donora,Pa. A7 .....6.325
Elyria,O. W8 .....6.625
Gary,Ind. R2 .....6.695
Hammond,Ind. L2, M13 6.625
Hartford,Conn. R2 ....6.925
Harvey,Ill. B5 .....6.625
Lackawanna,N.Y. B2..6.325
LosAngeles $30 .....8.30
Mansfield,Mass. B5 ..7.075
Massillon,O. R8 .....6.625
Massillon,O. R2 .....6.665
Midland,Pa. C18 .....6.625
Monaca,Pa. S17 .....6.625
Newark,N.J. W18 .....6.80
Plymouth,Mich. P5 ....6.525
So.Chicago W14 .....6.625
SpringCity,Pa. K3 ....6.80
Struthers,O. Y1 .....6.625
Warren,O. C17 .....6.625
Waukegan,Ill. A7 .....6.325
Worcester,Mass. A7 ..6.925
Youngstown F3, Y1 ....6.625

BARS, Reinforcing (Fabricators)
Atlanta A11 .....4.50
Birmingham C15 .....4.30
Buffalo(31) R2 .....4.33
Chicago(31) R2 .....4.37
Cleveland(31) R2 .....4.36
Emeryville,Calif. J7 ....4.90
Fairfield,Ala. T2 .....4.30
Fairless,Pa. U5 .....4.45
Fontana,Calif. K1 ....5.00
Ft.Worth,Tex.(42) 4.90
Gadsden,Ala.(31) R2 ...4.33
Gary,Ind. U5 .....4.30
Houston S5 .....4.70
Ind.Harbor,Ind. I-2, Y1.4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ..4.30
LosAngeles B3 .....5.00
Milton,Pa. M18 .....4.30
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....4.85
Pittsburg,Calif. C11 ....5.00
Pittsburgh J5 .....4.30
SandSprings,Okla. S5 ..5.15
Seattle B3, N14, P23...5.05
So.Duquesne,Pa. U5 ....4.30
So.SanFrancisco B3 ....5.05
SparrowsPoint,Md. B2 ..4.30
Sterling,Ill.(1) N15 ....4.30
Sterling,Ill. N15 .....4.40
Struthers,O. Y1 .....4.30
Torrance,Calif. C11 ....5.00
Youngstown U5 .....4.30
Youngstown(31) R2 ....4.35

BARS, Reinforcing
(Fabricated; to consumers)
Johnstown, ¼-1" B2 ..5.55
KansasCity S5 .....6.35
LosAngeles B3 .....5.95
Marion,O. P11 .....5.55
Seattle N14, P23 .....5.95
Seattle B3 .....6.15
So.SanFrancisco B3 ....6.00
SparrowsPt. ¼-1" B2 ..5.55
Williamsport,Pa. S19 ..5.60

RAIL STEEL BARS
Avis,Pa.(3) J8 .....4.25
ChicagoHts.(3) C2, I-2.4.20
ChicagoHts.(4) C2, I-2.4.30
Ft.Worth,Tex.(26) T4 ..4.75
Franklin,Pa.(3) F5 ....4.05
Franklin,Pa.(4) F5 ....4.15
Marion,O(3) P11 .....4.15
Moline,Ill.(3) R2 .....4.30
Tonawanda(3,4) B12 ...4.15
Williamsport,Pa.(3) S19.4.30

BARS, Wrought Iron
Economy,Pa.(S.R.) B14 10.85
Economy,Pa.(D.R.) B14 13.50
Economy(Staybolt) B14 13.80
McK.Rks.(S.R.) L5 ...10.85
McK.Rks.(D.R.) L5 ...14.75
McK.Rks.(Staybolt) L5 16.25

SHEETS

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 ..4.05
Allenport,Pa. P7 .....4.05
Ashland,Ky.(8) A10 ....4.05
Cleveland J5, R2 .....4.05
Conshohocken,Pa. A3 ..4.10
Detroit M1 .....4.075
Ecorse,Mich. G5 .....4.20
Fairfield,Ala. T2 .....4.05
Fairless,Pa. U5 .....4.10
Fontana,Calif. K1 ....4.825
Gary,Ind. U5 .....4.05
Geneva,Utah C11 .....4.15
GraniteCity,Ill. G4 ....4.25
Ind.Harbor,Ind. I-2, Y1 4.05
Irvin,Pa. U5 .....4.05

Kokomo,Ind. C16 .....4.15
Lackawanna,N.Y. B2 ..4.05
Mansfield,O. E6 (37) ..4.05
Mansfield,O. E6 (38) ..4.80
Munhall,Pa. U5 .....4.05
Newport,Ky N9 .....4.05
Niles,O. N12 .....4.05
Pittsburg,Calif. C11 ....4.75
Pittsburgh J5 .....4.05
Portsmouth,O. P12 ....4.05
Riverdale,Ill. A1 .....4.05
Sharon,Pa. S3 .....4.05
So.Chicago,Ill. W14 ...4.05
SparrowsPoint,Md. B2..4.05
Steubenville,O. W10 ....4.05
Warren,O. R2 .....4.05
Weirton,W.Va. W6 ....4.05
Youngstown U5, Y1 ....4.05

SHEETS, H.R. (19 ga. lighter)
AlabamaCity,Ala. R2 ..5.35
Kokomo,Ind. C16 .....5.20
Niles,O. N12 .....4.95

SHEETS, H.R. (14 ga. heavier)
High-Strength Low-Alloy
Cleveland J5, R2 .....6.10
Conshohocken,Pa. A3 ..6.15
Ecorse,Mich. G5 .....6.25
Fairfield,Ala. T2 .....6.10
Fairless,Pa. U5 .....6.15
Fontana,Calif. K1 ....6.875
Gary,Ind. U5 .....6.10
Ind.Harbor,Ind. I-2, Y1 6.10
Irvin,Pa. U5 .....6.10
Lackawanna(35) B2 ....6.10
Munhall,Pa. U5 .....6.10
Pittsburgh J5 .....6.10
Sharon,Pa. S3 .....6.10
So.Chicago,Ill. U5 ....6.10
SparrowsPoint(36) B2 ..6.10
Warren,O. R2 .....6.10
Weirton,W.Va. W6 ....6.10
Youngstown U5, Y1 ....6.10

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)
Ashland,Ky.(8) A10 ..4.30
Cleveland R2 .....4.65
Cleveland J5 .....4.775
Ind.Harbor,Ind. I-2 ...4.30
Warren,O. R2 .....4.65

SHEETS, Cold-Rolled Steel (Commercial Quality)
Allenport,Pa. P7 .....4.95
Cleveland J5, R2 .....4.95
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....4.95
Fairless,Pa. U5 .....5.00
Follansbee,W.Va. F4 ..4.95
Fontana,Calif. K1 ....6.05
Gary,Ind. U5 .....4.95
GraniteCity,Ill. G4 ....5.15
Ind.Harbor,Ind. I-2, Y1 4.95
Irvin,Pa. U5 .....4.95
Lackawanna,N.Y. B2 ..4.95
Middletown,O. A10 ....4.95
Pittsburg,Calif. C11 ...5.90
Pittsburgh J5 .....4.95
Portsmouth,O. P12 ....4.95
SparrowsPoint,Md. B2 ..4.95
Steubenville,O. W10 ....4.95
Warren,O. R2 .....4.95
Weirton,W.Va. W6 ....4.95
Youngstown Y1 .....4.95

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 .....7.50
Ecorse,Mich. G5 .....7.65
Fairless,Pa. U5 .....7.55
Fontana,Calif. K1 ....8.55
Gary,Ind. U5 .....7.50
IndianaHarbor,Ind. Y1..7.50
Irvin,Pa. U5 .....7.50
Lackawanna(37) B2 ..7.50
Pittsburgh J5 .....7.50
SparrowsPoint(38) B2 ..7.50
Warren,O. R2 .....7.50
Weirton,W.Va. W6 ....7.50
Youngstown Y1 .....7.50

SHEETS, Cold-Rolled Ingot Iron
Cleveland R2 .....5.55
Middletown,O. A10 ....5.45
Warren,O. R2 .....5.55

SHEETS, Culvert

	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.50	....
Canton,O. R2	6.50	7.10
Fairfield T2	6.25	6.50
Gary,Ind. U5	6.25	6.50
Ind.Harbor I-2	6.25	6.50
Irvin,Pa. U5	6.075	6.325
Kokomo,Ind. C16	6.35	....
MartinsFry.,O. W10	6.25	....
Newport,Ky. N9	6.25	6.50
Pitts.,Calif. C11	7.00	....
SparrowsPt. B2	6.25	....

SHEETS, Culvert Pure Iron
Ashland,Ky. A10 .....6.75
Fairfield,Ala. T2 .....6.50
MartinsFerry,O. W10 ..6.50

SHEETS, Galvanized Steel Hot-dipped
AlabamaCity,Ala. R2 ..5.45‡
Ashland,Ky. A10 .....5.45*
Butler,Pa. A10 .....5.45†
Canton,O. R2 .....5.45‡
Dover,O. R1 .....5.45‡
Fairfield,Ala. T2 .....5.45*
Gary,Ind. U5 .....5.45*
GraniteCity,Ill. G4 ....5.65‡
Ind.Harbor,Ind. I-2 ...5.45†
Irvin,Pa. U5 .....5.45†
Kokomo,Ind. C16.....5.55‡
MartinsFerry,O. W10 ..5.45*
Middletown,O. A10 ....5.45†
Newport,Ky. N9 .....5.45†
Niles,O. N12 .....5.45‡
Pittsburg,Calif. C11 ..6.20*
SparrowsPt.,Md. B2 ..5.45‡
Steubenville,O. W10 ..5.275‡
Weirton,W.Va. W6 ...5.45*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous

SHEETS, Galvanized High-Strength Low-Alloy
Irvin,Pa. U5 .....8.20
SparrowsPoint(39) B2 ..8.20

SHEETS, Galvanized Ingot Iron
Ashland,Ky.(8) A10 ...5.70
Canton,O. R2 .....6.20

SHEETS, Galvannealed Steel
Canton,O. R2 .....5.85
Irvin,Pa. U5 .....6.00
Kokomo,Ind. C16 .....5.95†
Newport,Ky. N9 .....6.00
Niles,O. N12 .....6.00

SHEETS, Galvanized Ingot Iron (Hot-dipped continuous)
Ashland,Ky. A10 .....5.70
Butler,Pa. A10 .....5.70
Middletown,O. A10 ....5.70

SHEETS, Electrogalvanized
Cleveland R2 (28) 6.30
Niles,O. R2 (28) 6.30
Weirton,W.Va. W6 ....5.975

SHEETS, Aluminum Coated
Butler,Pa. A10 .....8.625

SHEETS, Enameling Iron
Ashland,Ky.(8) A10 ..5.375
Cleveland R2 .....5.375
Gary,Ind. U5 .....5.375
GraniteCity,Ill. G4 ....5.575
Ind.Harbor,Ind. I-2 ..5.375
Irvin,Pa. U5 .....5.375
Middletown,O. A10 ....5.375
Niles,O. N12 .....5.375
Youngstown Y1 .....5.375

BLUED STOCK, 29 ga.
Follansbee,W.Va. F4 ..7.375
Follansbee(23) F4 ....6.60
Yorkville,O. W10 .....7.375

SHEETS, Long Terne Steel (Commercial Quality)
BeechBottom,W.Va. W10 5.85
Gary,Ind. U5 .....5.85
Mansfield,O. E6 .....5.85
Middletown,O. A10 ....5.85
Niles,O. N12 .....5.85
Weirton,W.Va. W6 ....5.85

SHEETS, Long Terne, Ingot Iron
Middletown,O. A10 ...6.25

SHEETS, Well Casing
Fontana,Calif. K1 ....6.325

STRIP

STRIP, Hot-Rolled Carbon
Ala.City,Ala.(27) R2 ...4.05
Allenport,Pa. P7 .....4.05
Alton,Ill. L1 .....4.225
Ashland,Ky.(8) A10 ....4.05
Atlanta A11 .....4.25
Bessemer,Ala. T2 .....4.05
Birmingham C15 .....4.05
Bridgeport,Conn.(10)S15 4.05
Buffalo(27) R2 .....4.05
Conshohocken,Pa. A3..4.175
Detroit M1 .....4.075
Ecorse,Mich. G5 .....4.20
Fairfield,Ala. T2 .....4.05
Fontana,Calif. K1 ....4.825
Gary,Ind. U5 .....4.05
Houston,Tex. S5 .....4.45
Ind.Harbor,Ind. I-2, Y1.4.05
Johnstown,Pa.(25) B2...4.05
KansasCity,Mo.(9) S5 ..4.65
Lackw'na,N.Y.(25) B2..4.05
LosAngeles(25) B3 ....4.80
Milton,Pa. M18 .....4.05
Minnequa,Colo. C10 ....5.15
NewBritain(10) S15 ....4.05
N.Tonawanda,N.Y. B11 4.05
Pittsburg,Calif. C11 ....4.80
Portsmouth,O. P12 ....4.05
Riverdale,Ill. A1 .....4.05
SanFrancisco S7 .....5.00
Seattle(25) B3, P23 ...5.05
Seattle N14 .....5.05
Sharon,Pa. S3 .....4.05
So.Chicago,Ill. W14 ....4.05
So.SanFrancisco(25) B3.4.80
SparrowsPoint,Md. B2...4.05
Sterling(1) N15 .....4.05
Sterling,Ill. N15 .....4.15
Torrance,Calif. C11 ....4.80
Warren,O. R2 .....4.05
Weirton,W.Va. W6 ....4.05
Youngstown U5 .....4.05

STRIP, Hot-Rolled Alloy
Bridgeport,Conn.(10)S15 6.45
Carnegie,Pa. S18 .....6.70
Fontana,Calif. K1 ....8.10
Gary,Ind. U5 .....6.70
Houston,Tex. S5 .....7.10
KansasCity,Mo. S5 .....7.30
LosAngeles B3 .....7.90
NewBritn.,Conn.(10)S15 6.45
Newport,Ky. N9 .....6.70
Seattle P23 .....7.80
Sharon,Pa. S3 .....6.70
So.Chicago W14 .....6.70
Youngstown U5 .....6.70

STRIP, Hot-Rolled High-Strength Low-Alloy
Bessemer,Ala. T2 .....6.15
Conshohocken,Pa. A3 ..5.95
Ecorse,Mich. G5 .....6.30
Fairfield,Ala. T2 .....6.15
Fontana,Calif. K1 .....7.25
Gary,Ind. U5 .....6.15
Ind.Harbor,Ind. I-2, Y1 6.15
Lackawanna,N.Y. B2 ...6.15
LosAngeles(25) B3 .....6.90
Seattle(25) B3, P23 ....7.15
Sharon,Pa. S3 .....6.15
So.SanFrancisco(25) B3.6.90
SparrowsPoint,Md. B2 ..6.15
Warren,O. R2 .....6.15
Weirton,W.Va. W6 ....6.15
Youngstown U5, Y1 ....6.15

STRIP, Hot-Rolled Ingot Iron
Ashland,Ky.(8) A10 ...4.30
Warren,O. R2 .....4.65

STRIP, Cold-Rolled Carbon
Anderson,Ind. G6 .....5.75
Baltimore T6 .....5.60
Bridgeport,Conn.(10)S15 5.75
Cleveland A7, J5 .....5.75
Dearborn,Mich. D3 ....5.90
Detroit M1 .....5.60
Detroit D2 .....5.90
Detroit P20 .....5.65
Dover,O. G6 .....5.75
Ecorse,Mich. G5 .....5.90
Follansbee,W.Va. F4 ..5.75
Fontana,Calif. K1 ....7.65
FranklinPark,Ill. T6 ...5.85
Ind.Harbor,Ind. I-2 ...6.00
Indianapolis C8 .....5.90
Lackawanna,N.Y. B2 ...5.75
LosAngeles C1 .....7.80
Mattapan,Mass. T6 ....6.30
Middletown,O. A10 ....5.75
NewBedford,Mass. R10..6.20
NewBritain(10) S15 ....5.75
NewCastle,Pa. B4, E5 ..5.75
NewHaven,Conn. A7 ....6.50
NewHaven,Conn. D2 ....6.20
Pawtucket,R.I. R3 ....6.40
Pawtucket,R.I. N8 ....6.30
Pittsburgh J5 .....5.75
Portsmouth,O. P12 .....5.75
Riverdale,Ill. A1 .....5.85
Rome,N.Y.(32) R6 .....5.75
Sharon,Pa. S3 .....5.75
SparrowsPt.,Md. B2, T6 5.75
Trenton,N.J. R5 .....7.00
Wall'ford,Conn. W2 ...6.20
Warren,O. B9 .....5.45
Warren,O. R2, T5 .....5.75
Weirton,W.Va. W6 ....5.75
Worcester,Mass. A7 ....6.60
Youngstown C8, Y1 ....5.75

STRIP, Cold-Rolled Alloy Steel
Carnegie,Pa. S18 .....12.45
Cleveland A7 .....12.45
Dover,O. G6 .....12.45
Fontana,Calif. K1 ....14.55
FranklinPark,Ill. T6 ..12.40
Harrison,N.J. C18 ....12.45
Mattapan,Mass. T6 ....12.80
Pawtucket,R.I. N8 ....12.80
Sharon,Pa. S3 .....12.45
Worcester,Mass. A7 ....12.75
Youngstown C8 .....12.90

STRIP, Cold-Rolled High-Strength Low-Alloy
Cleveland A7, J5 .....8.60
Dearborn,Mich. D3 ....8.35
Dover,O. G6 .....8.60
Ecorse,Mich. G5 .....8.75
Lackawanna,N.Y. B2..8.425
Pittsburgh J5 .....8.60
Sharon,Pa. S3 .....8.60
SparrowsPoint,Md. B2..8.425
Warren,O. R2 .....8.60
Weirton,W.Va. W6 ....8.60
Youngstown Y1 .....8.60

STRIP, Cold-Rolled Ingot Iron
Warren,O. R2 .....6.35

TIGHT COOPERAGE HOOP
Atlanta A11 .....4.775
Riverdale,Ill. A1 .....4.625
Sharon,Pa. S3 .....4.475
Youngstown U5 .....4.475

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.
B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Div., H. K. Porter Co. Inc.
B14 A. M. Byers Co.
B15 J. Bishop & Co.
C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Products
C24 G. O. Carlson Inc.
D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.
E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.
F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.
G2 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
H1 Hanna Furnace Corp.
H7 Helical Tube Co.
I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.
J1 Jackson Iron& Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel&Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.
L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott
N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Nrthwst.Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P23 Pacific Steel Rolling
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel
Y1 Youngstown Sheet & Tube

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	5.60	7.95	8.90	10.85	13.15
Bridgeport,Conn.(10) S15	5.75	8.05	9.00	10.95	13.25
Bristol,Conn. W1	...	...	9.30	11.45	....
Carnegie,Pa. S18	...	8.05	9.00	11.15	13.85
Cleveland A7	5.75	8.05	9.00	11.15	13.85
Cleveland,O. C7	...	8.05	9.00	11.15	13.85
Dearborn,Mich. D3	5.90	8.25	9.20	....	....
Detroit D2	5.90	8.25	9.20	10.95	....
Dover,O. G6	5.85	8.05	9.00	11.15	13.85
FranklinPark,Ill. T6	5.85	8.05	9.00	11.15	13.85
Harrison,N.J. C18	...	...	9.30	11.45	14.15
Indianapolis C8	...	8.20	9.00	10.85	....
Mattapan,Mass. T6	6.30	8.35	9.30	11.45	14.15
NewBritn.,Conn.(10) S15	5.75	8.05	9.00	11.15	13.85
NewCastle,Pa. B4	5.75	8.05	9.00	11.15	....
NewCastle,Pa. E5	5.75	8.05	9.00	10.95	13.25
NewHaven,Conn. D2	6.20	8.35	9.30	11.25	....
NewYork W3		*8.35*	*9.30*	*11.45*	*14.15*
Pawtucket,R.I. N8	6.30	8.35	9.30	11.45	14.15
Riverdale,Ill.(1) A1	5.85	8.05	9.00	11.15	13.85
Rome,N.Y.(32) R6	5.75	8.05	9.00	10.95	13.25
Sharon,Pa. S3	5.75	8.05	9.00	11.15	13.85
SparrowsPt.,Md. T6	5.75	8.35	9.30	11.45	14.15
Trenton,N.J. R5	...	8.35	9.30	11.45	14.15
Wallingford,Conn. W2	6.20	8.35	9.30	11.25	13.55
Warren,O. T5	5.75	8.05	9.00	10.95	13.25
Weirton,W.Va. W6	5.85	8.05	9.00	10.95	13.25
Worcester,Mass. A7	6.60	8.35	9.30	11.45	14.15
Worcester,Mass. T6	6.30	8.35	9.30	11.45	14.15
Youngstown C8	...	8.05	9.00	10.95	13.25
Spring Steel (Tempered)					
Bristol, Conn. W1	...	...	12.90	15.60	....
Buffalo W12	...	...	12.90	...	....
FranklinPark,Ill. T6	...	...	13.25	15.75	18.75
Harrison,N.J. C18	...	...	12.90	15.60	19.00
NewYork W3	...	...	*12.90*	*15.60*	*19.00*
Trenton,N.J. R5	...	...	12.90	15.60	19.00
Worcester,Mass. T6	...	...	12.90	15.60	19.00
Worcester,Mass. W12	...	...	12.90	...	....
Youngstown C8	...	...	12.85	15.35	18.35

SILICON STEEL

H.R. SHEETS (22 gage) (Cut Lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	9.10	10.10	11.00
Brackenridge,Pa. A4	...	...	9.10	10.10	11.00
IndianaHarbor,Ind. I-2	8.025	8.50	9.10	10.10	....
Mansfield,O. E6	8.025	8.50	9.10	10.10	11.00
Newport,Ky. N9	8.025	8.50	9.10	10.10	11.00
Niles,O. N12	8.025	8.50	9.10	10.10	....
Vandergrift,Pa. U5	...	8.50	9.10	10.10	11.00
Warren,O. R2	8.025	8.50	9.10	10.10	11.00
Zanesville,O. A10	...	8.50	9.10	10.10	11.00

C.R. CUT LENGTHS OR COILS (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	9.85	10.85	11.75
GraniteCity,Ill. G4	8.425*	8.95*	9.55*	10.55*	....
IndianaHarbor,Ind. I-2	8.225	8.75*	9.35*	....	....
Vandergrift,Pa. U5	...	9.25†	9.85†	10.85†	11.75†
Vandergrift,Pa. U5	8.225*	8.75*	9.35*	10.35*	11.25*
Warren,O. R2	8.225†	9.25	9.85	10.85	11.75

H.R. SHEETS (22 Gage) (Cut Lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	11.95	12.50	13.00	14.00
Brackenridge,Pa. A4	11.95	....	....	....
Newport,Ky. N9	11.95	....	....	....
Vandergrift,Pa. U5	11.95	12.50	13.00	14.00
Zanesville,O. A10	11.95	12.50	13.00	14.00

C.R. COILS & CUT LENGTHS (22 Ga.)	T-100	T-90	T-80	T-73	T-72
Butler,Pa. A10	....	....	16.60	17.10	....
Vandergrift,Pa. U5	14.00	15.00	16.60	17.00	12.70
Warren,O. R2	....	....	....	....	12.70‡

* Semiprocessed. † Fully processed only. ‡ Coils annealed; semiprocessed ½c lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.40	$7.65	$8.05
Fairfield,Ala. T2	7.50	7.75	8.15
Fairless,Pa. U5	7.50	7.75	8.15
Gary,Ind. U5	7.40	7.65	8.05
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.40	7.65	8.05
Irvin,Pa. U5	7.40	7.65	8.05
Niles,O. R2	7.40	7.65	8.05
Pittsburg,Calif. C11	8.15	8.40	8.80
SparrowsPoint,Md. B2	7.50	7.75	8.15
Weirton,W.Va. W6	7.40	7.65	8.05
Yorkville,O. W10	7.40	7.65	8.05

TIN PLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.70	$8.95
Fairfield,Ala. T2	8.80	9.05
Fairless,Pa. U5	8.80	9.05
Gary,Ind. U5	8.70	8.95
Ind.Har. I-2, Y1	8.70	8.95
Irvin,Pa. U5	8.70	8.95
Pitts.,Cal. C11	9.45	9.70
Sp.Pt.,Md. B2	8.80	9.05
Warren,O. R2	8.70	8.95
Weirton,W.Va. W6	8.70	8.95
Yorkville,O. W10	8.70	8.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.50
Fairfield,Ala. T2	6.60
Fairless,Pa. U5	6.60
Gary,Ind. U5	6.50
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1	6.50
Irvin,Pa. U5	6.50
Niles,O. R2	6.50
Pittsburg,Calif. C11	7.25
SparrowsPoint,Md. B2	6.60
Warren,O. R2	6.50
Weirton,W.Va. W6	6.50
Yorkville,O. W10	6.50

HOLLOWARE ENAMELING Black Plate (29 gage)	
Follansbee,W.Va. F4	6.10
Gary,Ind. U5	6.10
GraniteCity,Ill. G4	6.30
Ind.Harbor,Ind. Y1	6.10
Irvin,Pa. U5	6.10
Yorkville,O. W10	6.10

MANUFACTURING TERNES (Special Coated)	
Fairfield,Ala. T2	$7.85
Gary,Ind. U5	7.75
Irvin,Pa. U5	7.75
Yorkville,O. W10	7.75

MANUFACTURING TERNES, 8 lb	
Gary,Ind. U5	$9.75
Yorkville,O. W10	9.75

MANUFACTURING TERNES, LT. Coated, 6 lb	
Yorkville,O. W10	$8.65

ROOFING SHORT TERNES (8 lb Coated)	
Gary,Ind. U5	9.75

WIRE

WIRE, Manufacturers Bright, Low Carbon	
AlabamaCity,Ala. R2	5.75
Aliquippa,Pa. J5	5.75
Alton,Ill. L1	5.925
Atlanta A11	5.95
Bartonville,Ill. K4	5.85
Buffalo W12	5.75
Chicago W13	5.75
Cleveland A7, C20	5.75
Crawfordsville,Ind. M8	5.85
Donora,Pa. A7	5.75
Duluth,Minn. A7	5.75
Fairfield,Ala. T2	5.75
Fostoria,O.(24) S1	5.95
Houston S5	6.15
Jacksonville,Fla. M8	6.27
Joliet,Ill. A7	5.75
KansasCity,Mo. S5	6.35
Kokomo,Ind. C16	5.85
LosAngeles B3	6.70
Minnequa,Colo. C10	6.00
Monessen,Pa. P7	5.75
No.Tonawanda B11	5.75
Palmer,Mass. W12	6.05
Pittsburg,Calif. C11	6.70
Portsmouth,O. P12	5.75
Rankin,Pa. A7	5.75
So.Chicago,Ill. R2	5.75
So.SanFrancisco C10	6.70
SparrowsPoint,Md. B2	5.85
Sterling,Ill.(1) N15	5.75
Sterling,Ill. N15	5.85
Struthers,O. Y1	5.75
Waukegan,Ill. A7	5.75
Worcester,Mass. A7	6.05

WIRE, MB Spring, High Carbon	
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.375
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Cleveland A7	7.20
Donora,Pa. A7	7.20
Duluth,Minn. A7	7.20
Fostoria,O. S1	7.20
Johnstown,Pa. B2	7.20
LosAngeles B3	8.15
Millbury,Mass.(12) N6	7.225
Minnequa,Colo. C10	7.45
Monessen,Pa. P7, P16	7.20
Muncie,Ind. I-7	7.40
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Rankin,Pa. A7	7.50
So.Chicago,Ill. R2	7.20
So.SanFran. C10	8.15
SparrowsPt.,Md. B2	7.30
Struthers,O. Y1	7.20
Trenton,N.J. A7	7.50
Waukegan,Ill. A7	7.20
Worcester J4	*7.50*
Worcester A7, T6, W12	7.50

WIRE, Upholstery Spring	
Aliquippa,Pa. J5	6.90
Alton,Ill. L1	7.075
Buffalo W12	6.90
Cleveland A7	6.90
Donora,Pa. A7	6.90
Duluth,Minn. A7	6.90
Johnstown,Pa. B2	6.90
LosAngeles B3	7.85
Minnequa,Colo. C10	7.075
Monessen,Pa. P7, P16	6.90
NewHaven,Conn. A7	7.20
Palmer,Mass. W12	7.20
Pittsburg,Calif. C11	7.85
Portsmouth,O. P12	6.90
Roebling,N.J. R5	7.20
So.Chicago,Ill. R2	6.90
So.SanFrancisco C10	7.85
SparrowsPoint,Md. B2	7.00
Trenton,N.J. A7	7.20
Waukegan,Ill. A7	6.90
Worcester,Mass. A7	7.20

WIRE, Fine & Weaving(8" Coils)	
Alton,Ill. L1	11.375
Bartonville,Ill. K4	11.30
Buffalo W12	11.20
Chicago W13	10.55
Cleveland A7	11.20
Crawfordsville,Ind. M8	11.30
Fostoria,O. S1	11.20
Jacksonville,Fla. M8	11.73
Johnstown,Pa. B2	10.55
Kokomo,Ind. C16	10.55
Minnequa,Colo. C10	10.95
Monessen,Pa. P16	11.20
Muncie,Ind. I-7	11.40
Palmer,Mass. W12	11.50
Roebling,N.J. R5	11.50
So.SanFrancisco C10	11.55
Waukegan,Ill. A7	11.20
Worcester,Mass. A7,T6	11.50

WIRE, Galv'd ACSR for Cores	
Bartonville,Ill. K4	9.90
Buffalo W12	9.90
Johnstown,Pa. B2	9.90
Minnequa,Colo. C10	10.025
Monessen,Pa. P16	9.90
Muncie,Ind. I-7	10.10
Portsmouth,O. D2	9.50
Roebling,N.J. R5	10.20
SparrowsPt.,Md. B2	10.00

ROPE WIRE (A)	
Alton,Ill. L1	9.45
Bartonville,Ill. K4	9.35
Buffalo W12	9.35
Fostoria,O. S1	9.75
Johnstown,Pa. B2	9.75
Monessen,Pa. P7	9.35
Monessen,Pa. P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	9.65
Portsmouth,O. P12	9.35
Roebling,N.J. R5	9.65
SparrowsPt. B2	9.85
Struthers,O. Y1	9.75
Worcester J4, T6	9.65

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead	
Alton,Ill. L1	12.75
Bartonville,Ill. K4	13.25
Monessen,Pa. P16	13.15
Roebling,N.J. R5	13.45

WIRE, Cold-Rolled Flat	
Anderson,Ind. G6	7.95
Baltimore T6	7.75
Buffalo W12	7.95
Cleveland A7	7.95
Crawfordsville,Ind. M8	8.05
Dover,O. G6	7.95
Fostoria,O. S1	7.95
Kokomo,Ind. C16	7.55
FranklinPark,Ill. T6	8.05
Massillon,O. R8	7.95
Monessen,Pa. P7, P16	7.95
Pawtkt.,R.I. N8	8.25
Rome,N.Y.(32) R6	7.95
SparrowsPt.,Md., T6	8.25
Trenton,N.J. R5	8.25
Worcester A7, T6, W12	8.25

WIRE, Merchant Quality (6 to 8 gage)	An'ld. Galv.
Ala.City R2	6.90 7.30**
Aliquippa J5	6.90 7.425*
Atlanta A11	7.00 7.55
Bartonville(48) K4	7.00 7.55
Buffalo W12	6.90 7.30†
Cleveland A7	6.90 ....
Crawfordsville M8	7.00 7.55
Donora,Pa. A7	6.90 7.30†
Duluth,Minn. A7	6.90 7.30†
Fairfield T2	6.90 7.30†
Houston,Tex. S5	7.30 7.70
Jacks'ville,Fla. M8	7.425 7.95
JohnstownB2(48)	6.90 7.45*
Joliet,Ill. A7	6.90 7.30†
KansasCity,Mo. S5	7.50 7.90
Kokomo C16	7.00 7.40†
LosAngeles B3	7.85 ....
Minnequa C10	7.15 7.55**
Monessen P7 (48)	6.90 7.45
Palmer W12	7.20 7.60†
Pitts.,Calif. C11	7.85 8.25†
Portsmouth(48)P12	6.90 ....
Rankin A7	6.90 7.30†
So.Chi'go R2	6.90 7.30**
S.S.Frn.(48)C10	7.85 8.25**
Spar'wsPt.B2(48)	7.00 7.55*
Stri'g(1)(48)N15	6.90 7.45
Struthers,O. Y1	6.90 7.40‡
Worcester A7	7.20 ....

* Based on 10c zinc; † 5c zinc; ‡ Less than 10c zinc; ** Subject to zinc equalization extras.

WOVEN FENCE, 9-15½Ga.	Col.
Ala.City,Ala. R2	146**
Ala.City, 17 ga. R2	241**
Ala.City, 18 ga. R2	251**
Aliq'ppa,Pa.9-14½ga.J5	149*
Atlanta A11	151
Bartonville,Ill. K4	151
Crawfordsville,Ind. M8	151
Donora,Pa. A7	146†
Duluth,Minn. A7	146†
Fairfield,Ala. T2	146†
Houston,Tex. S5	154
Johnstown,Pa. B2	149
Joliet,Ill. A7	146†
KansasCity,Mo. S5	158
Kokomo,Ind. C16	148†
Minnequa,Colo. C10	154**
Monessen,Pa. 9 ga, P17	151
Pittsburg,Calif. C11	169†
Rankin,Pa. A7	146†
So.Chicago,Ill. R2	146**
Sterling,Ill.(1) N15	149

† Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	155
Atlanta A11	157
Bartonville,Ill. K4	157
Crawfordsville,Ind. M8	157
Donora,Pa. A7	155
Duluth,Minn. A7	155
Fairfield,Ala. T2	155
Joliet,Ill. A7	155
KansasCity,Mo. S5	167
Kokomo,Ind. C16	157
Minnequa,Colo. C10	160
Pittsburg,Calif. C11	179
So.Chicago,Ill. R2	155
So.SanFran.,Calif. C10	179
SparrowsPoint,Md. B2	157
Sterling,Ill.(1) N15	155

WIRE, Barbed	Col.
AlabamaCity R2	159**
Aliquippa J5	156*
Atlanta A11	164
Bartonville,Ill. K4	164
Crawfordsville,Ind. M8	164
Donora,Pa. A7	159†
Duluth,Minn. A7	159†
Fairfield,Ala. T2	159†
Houston,Tex. S5	167
Johnstown,Pa. B2	162*
Joliet,Ill. A7	159†
KansasCity,Mo. S5	171
Kokomo,Ind. C16	161†
Minnequa,Colo. C10	165**
Monessen,Pa. P7	163
Pittsburg,Calif. C11	179†
Rankin,Pa. A7	159†
So.Chicago,Ill. R2	159**
S.SanFrancisco C10	179**
SparrowsPoint,Md. B2	164*
Sterling,Ill.(1) N15	162

† Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

WIRE (16 gage)	An'ld. Galv. Stone	Galv. Stone
Ala.City R2	13.15	14.70**
Aliquippa J5	12.50	14.30*
Bartonville K4	13.25	15.10
Buffalo W12	13.15	....
Cleveland A7	13.15	....
CrawfordsvilleM8	13.25	15.10
Fostoria,O. S1	13.25	14.80
Johnstown B2	12.50	14.35*
Kokomo C16	12.60	14.15†
Minnequa C10	13.40	15.10**
Palmer,Mas.W12	13.15	14.70*
Pitts.,Calif. C11	13.50	15.05†
So.Chicago R2	13.15	14.70
SparrowsPt. B2	12.60	14.45*
Sterling(1) N15	13.15	15.00
Waukegan A7	13.15	14.70†
Worcester A7	13.45	....

* Based on 11c zinc; † 5c zinc; ** Subject to zinc equalization extras.

NAILS, Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	137
Aliquippa,Pa. J5	137
Atlanta A11	139
Bartonville,Ill. K4	139
Chicago,Ill. W13	137
Cleveland A9	142
Crawfordsville,Ind. M8	139
Donora,Pa. A7	137
Duluth,Minn. A7	137
Fairfield,Ala. T2	137
Galveston,Tex. D7	139
Houston,Tex. S5	145
Johnstown,Pa. B2	137
Joliet,Ill. A7	137
KansasCity,Mo. S5	149
Kokomo,Ind. C16	139
Minnequa,Colo. C10	142
Monessen,Pa. P7	137
Pittsburg,Calif. C11	156
Rankin,Pa. A7	137
So.Chicago,Ill. R2	137
SparrowsPt.,Md. B2	139
Sterling,Ill.(1) N15	137
Worcester,Mass. A7	143

NAILS, CUT (100 lb keg) To dealers (33)	
Conshohocken,Pa. A3	$8.30
Wheeling,W.Va. W10	8.30

STAPLES, Polished Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	138
Aliquippa,Pa. J5	138
Atlanta A11	140
Bartonville,Ill. K4	140
Crawfordsville,Ind. M8	140
Donora,Pa. A7	138
Duluth,Minn. A7	138
Fairfield,Ala. T2	138
Johnstown,Pa. B2	138
Joliet,Ill. A7	138
Kokomo,Ind. C16	140
Minnequa,Colo. C10	143
Monessen,Pa. P7	138
Pittsburg,Calif. C11	157
Rankin,Pa. A7	138
So.Chicago,Ill. R2	138
SparrowsPt.,Md. B2	140
Sterling,Ill.(1) N15	138
Worcester,Mass. A7	144

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2, I-2	150
Duluth,Minn. A7	150
Franklin,Pa. F5	150
Johnstown,Pa. B2	145
Marion,O. P11	145
Minnequa,Colo. C10	155
Moline,Ill. R2	150
So.Chicago,Ill. R2	145
Tonawanda,N.Y. B12	145
Williamsport,Pa. S19	150

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	13.5	list	17.5	0.25	20	2.75	21.5	4.25	21.5	4.25	20.75	3.5	23.25	6
Ambridge, Pa. N2 (†)	13.5	...	17.5	...	20.0	...	21.5	...	21.5	...	20.75	...	23.25	...
Lorain, O. N3 (*)	13.5	2.25	17.5	3.25	20	5.75	21.5	7.25	21.5	7.25	20.75	6.5	23.25	9
Youngstown Y1 (††)	13.5	+1.5	17.5	0.75	20	3.25	21.5	4.75	21.5	4.75	20.75	4	23.25	6.5

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2 (**)	13.5	1.5	17.5	0.75	20.0	3.25	21.5	4.75	21.5	4.75	20.75	4.0	23.25	6.5

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼		1½	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c		27.5c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28		2.73	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	...	...	....	....	....	....	23.75	7.5	26.75	11.5	29.25	15	31.75	16	32.25	17
Alton, Ill. L1 (§)	...	...	....	....	....	....	21.75	6.5	24.75	10.5	27.25	14	29.75	14.75	30.25	15.75
Benwood, W.Va. W10(††)	24	+2.5	15.25	+8.25	7.25	+14.25	23.75	8.5	26.75	12.5	29.25	16	31.75	16.75	32.25	17.75
Butler, Pa. F6‡‡	25	+1.5	17	+6.5	9.5	+12	...	...	...	...	...	...	...	...	...	...
Etna, Pa. N2 (†)	...	...	....	....	....	....	23.75	8.5	26.75	12.5	29.25	16	31.75	16.75	32.25	17.75
Fairless, Pa. N3	...	...	....	....	....	....	19.25	..	22.25	..	24.75	...	27.25	....	27.75	....
Fontana, Calif. K1 (§)	...	...	....	....	....	....	10.75	+4.5	13.75	+0.5	16.25	3	18.75	3.75	19.25	4.75
Ind. Harbor Y1 (††)	...	...	....	....	....	....	22.75	7.5	25.75	11.5	28.25	15	30.75	15.75	31.25	16.75
Lorain, O. N3 (*)	...	...	....	....	....	....	23.75	13.5	26.75	17.5	29.25	21	31.75	20.5	32.25	21.5
Sharon, Pa. S4 (‡)	25	+1.5	17	+6.5	9.5	+12	..	..	..	..	..	..	..	..	..	..
Sharon, Pa. M6	...	...	....	....	....	....	23.75	8.5	26.75	12.5	29.25	16	31.75	16.75	32.25	17.75
Sparrows Pt., Md. B2 (§)	23	+3.5	15	+8.5	7.5	+14	31.7	6.5	24.75	10.5	27.25	13	29.75	14	30.25	16
Youngstown R2 (**)	...	...	....	....	....	....	23.75	8.5	26.75	12.5	29.25	16	31.75	16.75	32.25	17.75
Youngstown Y1 (††)	...	...	....	....	....	....	23.75	8.5	26.75	12.5	29.25	16	31.75	16.75	32.25	17.75
Wheatland, Pa. W9(§)	23	+3.5	15	+8.5	7.5	+14	23.75	8.5	26.75	12.5	29.25	16	31.75	16.75	32.25	17.75

Size—Inches	2		2½		3		3½		4	
List Per Ft	37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5(‡)	32.75	17.5	34.25	17.5	34.25	17.5	....	....	....	....
Alton, Ill. L1 (§)	30.75	16.25	32.35	16	32.25	16	23.25	6.75	23.25	6.75
Benwood, W.Va. W10(††)	32.75	18.25	34.25	18	34.25	18	25.5	8.75	25.5	8.75
Etna, Pa. N2 (†)	32.75	18.25	34.25	19.0	34.25	19.0	25.5	8.75	25.5	8.75
Fairless, Pa. N3	28.25	....	29.75	....	29.75	...	21	....	21	....
Fontana, Calif. K1 (§)	19.75	5.25	21.25	5	21.25	5	12.50	+4.25	12.50	+4.25
Ind. Harbor, Ind. Y1 (††)	31.75	17.25	33.25	17	33.25	17	....	....	....	....
Lorain, O. N3 (*)	32.75	22	34.25	20.5	34.25	20.5	....	....	....	....
Sharon, Pa. M6	32.75	18.25	34.25	18	34.25	18	....	....	....	....
Sparrows Pt., Md. B2 (§)	29.75	15.5	32.25	15.5	32.25	15.5	23.5	6.25	23.5	6.25
Youngstown R2 (**)	32.75	18.25	34.25	18	34.25	18.0	25.50	8.75	25.50	8.75
Youngstown Y1 (††)	32.75	18.25	34.25	18	34.25	18	....	....	....	....
Wheatland, Pa. W9 (‡)	32.75	18.25	34.25	18	34.25	18	....	....	....	....

Galvanized pipe discounts based on zinc price of: (†), 14c; (‡), 11c to under 12c; (*), 5c; (§), over 9c to 11c inclusive; (††), 10.50c-11.50c; (**), 9.50c; with discounts adjusted on price of zinc at time of shipment; (‡‡), 11c.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	19.59	19.00
1¼	13	....	23.21	18.77
1½	13	21.40	25.65	20.75
1⅝	13	25.28	30.31	24.52
2	13	28.33	33.97	27.48
2¼	13	31.91	38.26	30.95
2¼	12	34.63	41.52	33.59
2½	12	38.15	45.74	37.00
2¾	12	41.31	49.53	40.07
3	12	44.05	52.82	42.72

RAILWAY MATERIALS

RAILS	Std. No. 1	Std. No. 2	All No. 2	Std. Toe Rails 60 lb Under
Bessemer, Pa. U5	4.45	4.35	4.40	5.35
Ensley, Ala. T2	4.45	4.35	....	5.35
Fairfield, Ala. T2	....	....	....	5.35
Gary, Ind. U5	4.45	4.35	4.40	....
Huntington, W.Va. W7	....	....	....	5.35
Indiana Harbor, Ind. I-2	4.45	4.35	4.40	....
Johnstown, Pa. B2	....	....	...(16)	5.20
Lackawanna, N.Y. B2	4.45	4.35	....	5.35
Minnequa, Colo. C10	4.45	4.35	....	5.85
Steelton, Pa. B2	4.45	4.35	....	5.35
Williamsport, Pa. S19	....	....	....	5.35

TIE PLATES

Fairfield, Ala. T2 .....5.275
Gary, Ind. U5 .....5.275
Ind. Harbor, Ind. I-2 ...5.275
Lackawanna, N.Y. B2..5.275
Minnequa, Colo. C10 ...5.275
Seattle B3 .....5.425
Steelton, Pa. B2 .....5.275
Torrance, Calif. C11 ..5.425

TRACK BOLTS (20) Treated

Cleveland R2 .....11.50
Kansas City, Mo. S5 ....11.50
Lebanon, Pa. B2 .....11.50
Minnequa, Colo. C10 ....11.50
Pittsburgh O3 .....11.50
Pittsburgh P14 .....11.50
Seattle, Wash. B3 .....12.00

JOINT BARS

Bessemer, Pa. U5 .....5.425
Fairfield, Ala. T2 .....5.425
Ind. Harbor, Ind. I-2 ...5.425
Joliet, Ill. U5 .....5.425
Lackawanna, N.Y. B2..5.425
Minnequa, Colo. C10 ...5.425
Steelton, Pa. B2 .....5.425

SCREW SPIKES

Cleveland R2 .....11.00

AXLES

Ind. Harbor, Ind. S13 ...6.75
Johnstown, Pa. B2 .....6.75

STANDARD TRACK SPIKES

Fairfield, Ala. T2 .....7.30
Ind. Harbor, Ind. I-2, Y1.7.30
Kansas City, Mo. S5 ....7.30
Lebanon, Pa. B2 .....7.30
Minnequa, Colo. C10 ....7.30
Pittsburgh J5 .....7.30
Seattle B3 .....7.80
So. Chicago, Ill. R2 .....7.30
Struthers, O. Y1 .....7.30
Youngstown R2 .....7.30

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.
Structural ½-in., larger 9.25
⅞-in. under..List less 37%

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS
(F.o.b. midwestern plants, per cent off list for less than case lots to consumers)
6 in. and shorter:
½-in. & smaller diam. 4
⅝-in. & ⅝-in. 5
¾-in. and larger 3
Longer than 6 in.:
All diameters ..... +4
Lag bolts, all diams.:
6 in. and shorter.... 12
Over 6 in. long 8
Ribbed Necked Carriage 5
Blank 25
Plow 25
Step, Elevator, Tap and Sleigh Shoe 12
Tire Bolts .....List
Boiler & Fitting-Up Bolts 23

NUTS

H.P. and C.P., regular & heavy:
Square, all sizes 58
H.P., Hex, regular & heavy:
⅝" and smaller 58
⅞" to 1⅛", inclusive 60
1 1/4" to 1½", inclusive 62
1⅝" and larger 58
C.P. Hex regular & heavy:
All sizes 58
Hot Galv. Nuts (all types):
⅝" to 1⅛", inclusive. 40
⅞" to 1½", inclusive. 43
Finished Hex Nuts:
New standard, all sizes 58
Semifinished & Slotted Hex:
Regular and heavy, all sizes 58

SQUARE HEAD SET SCREWS
(Packaged; per cent off list)
1 in. diam. x 6 in. and shorter 34
1 in. and smaller diam. x over 6 in. 20

HEADLESS SET SCREWS
(Packaged; per cent off list)
No. 10 and smaller 34
¼ in. diam & larger.... 14
N.F. thread, all diams. 8

STEEL STOVE BOLTS
(F.o.b. plant, per cent off list in packages)
Plain finish .....37.5—10
Plated finishes .....30—10

HEXAGON CAP SCREWS
(1020 steel; packaged; per cent off list)
6 in. or shorter:
⅝-in. & smaller 38
¾-in. through 1 in. .. 22
Longer than 6 in.:
⅝-in. and smaller ... 20
¾-in. through 1 in. .. 7

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron: 98+% Fe, annealed	18.00
Unannealed	
Minus 100 mesh...	14.50
Minus 35 mesh ..	10.25
Minus 20 mesh ..	10.00
Swedish, c.l.f. N. Y., c.l., in bags	11.25
Domestic (Swedish), f.o.b. Riverton, N. J., in bags ...	11.25
Electrolytic iron:	
Melting stock, 99.91% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+% Fe)	32.50
Unannealed (99+% Fe) (minus 325 mesh)	52.00
Powder Flakes (minus 16, plus 100 mesh)..	31.00
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns..83.00-148.00	
Aluminum:	
Atomized, 500 lb drums, frgt. allowed:	
Carlots	32.00
Ton lots	34.00
Antimony, 500 lb lots	32.00*
Brass, ¼-ton lots .....28.75-37.50†	
Bronze, ¼-ton lots .....31.00-39.00†	
Copper:	
Electrolytic 13.50*	
Reduced 13.50*	
Lead	7.50*
Manganese:	
Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed ...	89.50
Nickel-Silver, ¼-ton lots .....45.75‡	
Nickel-Silver, ¼-ton lots 48.50**	
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	43.50
Solder	8.50*
Stainless Steel, 302 ...	91.00
Tin	14.50*
Zinc, ¼-ton lots.18.25-32.00‡	
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over....	4.95
Less than 1000 lb ..	5.10
Chromium electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni; **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flat, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼" to 1 7/16"; 1 7/16" to 1 15/16" 4.78c; 1 15/16" to 7 5/16" 5.15c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 4.95c.
(27) Bar mill sizes.
(28) Bonderized
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon and 0.35c H.S.-L.A.
(31) Base; deld. within mill county.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" and narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. to mill zone or within switching limits, 5.10c.
(43) 6-7 gage.

STAINLESS STEEL MILL PRICES

(Representative prices cents per pound; subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. H.R. Strip	Bars; H.R. Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.25	20.50	29.50	34.25	29.75	35.25	37.25	41.25	38.25
302	17.25	22.75	29.75	34.50	32.00	35.50	37.50	41.50	41.50
302B	18.50	24.50	30.50	34.50	35.00	35.50	37.50	44.75	44.75
303	18.75	24.75	32.25	37.25	36.75	38.25	39.75	48.75	45.50
304	18.25	23.75	31.00	36.00	34.25	37.25	39.75	43.75	43.75
304L	....	....	36.75	....	....	42.75	45.25	49.00	49.00
306	19.50	25.50	....	36.25	37.00	37.50	42.00	51.75	46.75
308	19.75	26.25	35.25	40.75	38.00	42.00	46.00	48.00	48.00
309	26.50	34.75	43.25	49.25	49.25	50.50	53.75	62.00	62.00
309S	28.50	37.50	47.50	54.50	54.00	55.50	59.00	68.50	68.50
310	33.00	43.25	56.75	66.25	62.75	67.50	69.00	72.25	72.25
314	....	....	....	....	....	....	69.00	74.50	....
316	28.00	36.25	46.75	54.50	53.25	55.50	59.00	62.75	62.75
316L	....	....	52.50	....	58.25	61.00	64.25	67.75	67.75
317	33.00	43.50	58.25	66.75	67.50	68.25	70.75	77.00	77.00
318	33.50	44.00	55.25	64.50	66.25	65.50	68.75	80.25	80.25
321	22.75	29.50	35.25	40.75	41.00	42.00	46.00	50.50	50.50
330	....	....	....	58.00	....	....	68.50	70.00	73.75	77.75
347	24.50	32.25	39.50	45.75	46.50	46.75	51.25	59.25	59.25
403	....	....	27.00	30.75	....	32.00	34.25	44.00	41.25
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	39.75	39.75
410	14.00	18.25	24.00	27.75	26.25	28.75	30.00	34.25	34.25
416	....	....	24.50	28.25	....	29.25	30.50	41.25	41.25
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	52.75	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	34.75	34.75
430F	....	18.75	25.00	28.75	....	29.75	31.00	44.00	44.00
431	14.50	28.50	25.00	28.25	27.50	29.25	30.50	35.25	35.25
440A,B,C	....	28.50	29.25	34.00	....	35.00	38.50	49.25	52.75
442	....	....	....	28.00	....	....	30.50	35.25	48.25	47.75
446	....	....	....	33.75	38.25	50.25	39.50	40.75	59.75	59.75
501	....	....	....	14.00	14.50	21.25	16.00	18.25	29.00	29.00
502	....	....	....	15.25	16.00	22.25	17.00	20.00	30.00	30.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co., Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

CLAD STEEL

Cladding Stainless	Plates: Carbon Base 10%	Plates: Carbon Base 20%	Sheets: Carbon Base 20%	Sheets: Copper Base Both Sides
302	....	31.00	31.00	77.00
304	27.60	32.50-32.70	32.50	77.00
310	36.50	41.00	.....	144.00
316	32.60	37.70-42.75	42.75	....
318	37.00	42.20	.....	....
321	29.80	34.40-37.00	37.00	111.00
347	30.40	35.50-40.50	40.50	130.00
405	23.40	30.60	.....	....
410	22.90	30.10	.....	....
430	22.90	30.10	.....	....
Inconel	41.23	54.18	.....	165.00
Nickel	37.50	50.90	.....	....
Monel	38.90	51.80	.....	....
Copper*	....	.....	46.00	....

	Strip, Carbon Base: Cold-Rolled 10%	Cold-Rolled Both Sides	Hot-Rolled 10%	Hot-Rolled Both Sides
Copper*	28.85	35.85	25.00	32.25

* Deoxidized. Production points: Stainless sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; Copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie, Pa. A13.

TOOL STEEL

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.26	5% Cr Hot Work	0.405
Extra Carbon	0.31-.315	W-Cr Hot Work	0.425
Special Carbon	0.37	V-Cr Hot Work	0.445
Oil Hardening	0.405	Hi-Carbon-Cr	0.73

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.030
19	4	2	12	...	3.990
18.25	4.25	1	4.75	...	2.245-2.415
18	4	2	9	...	2.615
18	4	2	....	...	1.705
18	4	1	....	...	1.540
18	4	1	5	...	2.250
14	4	2	5	...	2.185
13.75	3.75	2	5	...	2.185
13.5	4	3	....	...	1.805
9	3.5	...	....	...	1.115
6	4	2	....	5	1.045
6	4	3	....	6	1.290
1.5	4	1	....	8.5	0.990

Tool Steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

PIG IRON Gross Ton

F.o.b furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
AlabamaCity R2	52.38	52.88	....	....
Birmingham R2	52.38	52.88	....	....
Birmingham U6	....	52.88	56.50†	....
Woodward,Ala. W15	52.38	52.88	56.50†	....
Cincinnati, del.	....	60.43	....	....
Buffalo District				
Buffalo R2, H1	56.00	56.50	57.00	....
Tonawanda,N.Y. W12	56.00	56.50	57.00	....
No.Tonawanda,N.Y. T9	....	56.50	57.00	57.50
Boston, del.	66.65	67.15	67.65	....
Rochester,N.Y., del.	59.02	59.52	60.02	....
Syracuse,N.Y., del.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Gary,Ind. U5	56.00	....	56.50	....
IndianaHarbor,Ind. I-2	56.00	....	56.50	....
So.Chicago,Ill. W14, Y1	56.00	56.50	56.50	....
So.Chicago,Ill. U5	56.00	....	56.50	57.00
Milwaukee, del.	58.17	58.67	58.67	59.17
Muskegon,Mich., del.	....	62.80	62.80	....
Cleveland District				
Cleveland A7	56.00	56.50	56.50	57.00
Cleveland R2	56.00	56.50	56.50	....
Akron,O., del. from Cleve.	58.75	59.25	59.25	59.75
Lorain,O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem,Pa. B2	58.00	58.50	59.00	59.50
NewYork, del.	....	62.28	62.78	....
Newark, del.	61.02	61.52	62.02	62.52
Birdsboro,Pa. B10	58.00	58.50	....	....
Chester,Pa. C31	....	*48.50*	*49.00*	....
Steelton,Pa. B2	58.00	58.50	59.00	59.50
Swedeland,Pa. A3	58.00	58.50	59.00	59.50
Philadelphia, del.	59.66	60.16	60.66	61.16
Troy, N. Y. R2	58.00	58.50	59.00	....
Pittsburgh District				
NevilleIsland,Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Ambridge, Aliquippa, del.	57.37	57.87	57.87	58.37
McKeesRocks, del.	57.04	57.54	57.54	58.04
Lawrenceville,Homestead, Wilmerding,Monaca, del.	57.66	58.16	58.16	58.66
Verona,Trafford, del.	58.19	58.69	58.69	59.19
Brackenridge, del.	58.45	58.95	58.95	59.45
Bessemer,Pa. U5	56.00	....	56.50	57.00
Clairton,Rankin,So.Duquesne,Pa. U5	56.00	....	....	....
McKeesport,Pa. N3	56.00	....	....	57.00
Midland,Pa. C18	56.00	....	....	....
Monessen,Pa. P7	56.00	....	....	....
Youngstown District				
Hubbard,O. Y1	....	....	56.50	....
Sharpsville,Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield,O., del.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie,Pa. I-3	56.00	56.50	56.50	57.00
Everett,Mass. E1	60.50	61.00	61.50	....
Fontana,Calif. K1	62.00	62.50	....	....
Geneva,Utah C11	56.00	56.50	....	....
GraniteCity,Ill. G4	57.90	58.40	58.90	....
Ironton,Utah C11	56.00	56.50	....	....
LoneStar,Texas L6	52.00	52.50*	52.50	....
Minnequa,Colo. C10	58.00	59.00	59.00	....
Rockwood,Tenn. T2	....	52.50*	56.50	....
Toledo,O. I-3	56.00	56.50	56.50	57.00
Cincinnati, del.	61.76	62.26	....	....

* Low phos. southern grade. † Phos., 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.50 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson,O. G2, J1	$67.00
Buffalo H1	68.25

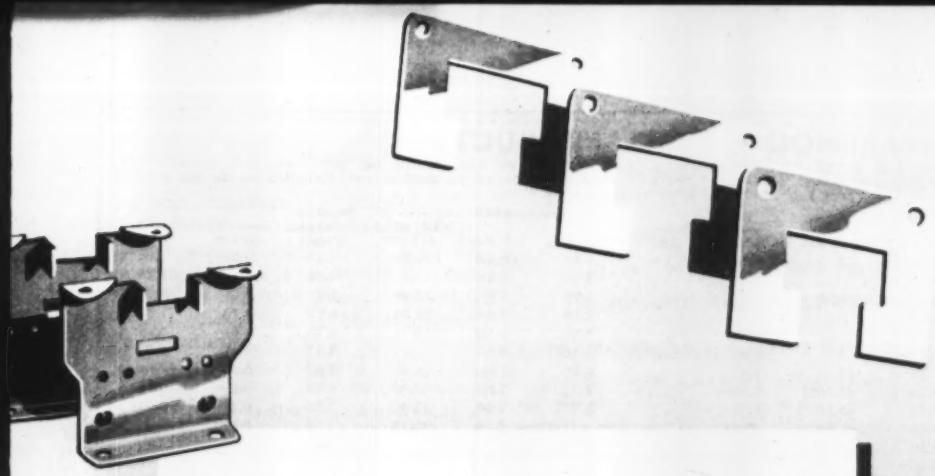
ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.45 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$87.50
Keokuk,Iowa, Openhearth & Fdry, freight allowed K2	92.00
Keokuk, OH & Fdry, 12½ lb pigiets, 16% Si, frgt allowed K2	95.00
Wenatchee,Wash. OH & Fdry, freight allowed K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate A7	$61.00
Rockwood,Tenn. T3	70.00
Steelton,Pa. B2	64.00
Philadelphia, del.	64.00
Troy,N.Y. R2	64.00



Weirzin

ELECTROLYTIC ZINC-COATED SHEETS

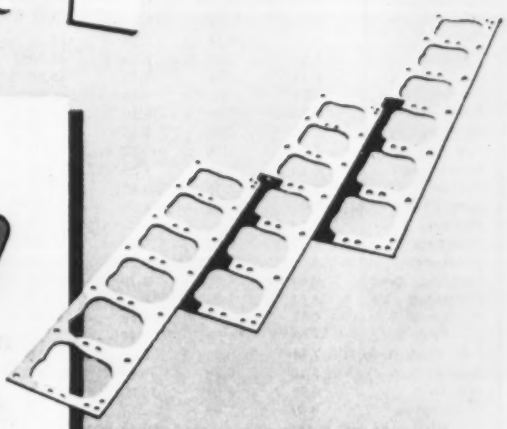
Cut manufacturing costs!

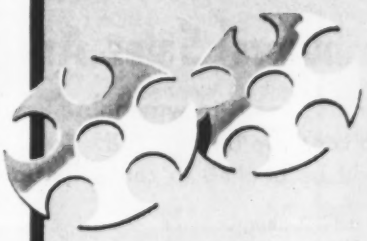
- Speed production
- Increase die life
- Reduce die maintenance

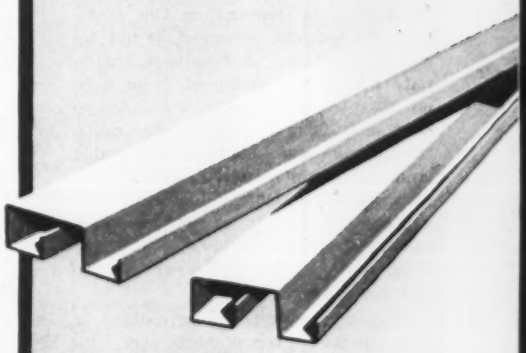
From the first day you use Weirzin you will find a marked reduction in manufacturing costs. Your production rate will increase with less time spent on die maintenance and replacement. The tight zinc-coating, electrolytically applied to Weirzin steel, actually lubricates dies without leaving a zinc deposit—thereby reducing die maintenance expense and lengthening die life.

One fabricator reported a 300 per cent increase in production per set of dies after changing to Weirzin from ordinary carbon steel. This is an economy factor too great to be ignored.

Add to this the fact that the zinc coating on Weirzin will not flake, peel or powder under the most severe fabricating operations and you will quickly realize what production economies Weirzin has to offer. Write today for further information on how Weirzin can cut your manufacturing costs—and make your product a better one.







WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

NATIONAL STEEL CORPORATION

WEIRTON STEEL COMPANY

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except Birmingham, St. Paul, 15 cents; Boston, Philadelphia, New York, 10 cents; Seattle and Spokane, Wash., no change; at Buffalo and Philadelphia, on cold-finished bars and sheets and alloy bars, 25 cents.)

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	Stainless Type 302	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.§	H.R. Alloy 4140††‖		Carbon	Floor
Baltimore	6.22	7.51	7.77	....	6.89	...	6.88	8.52‖	12.04	6.92	6.57	7.96**
Birmingham	6.35	7.35	8.25‡	....	6.60	...	6.50	9.10	....	6.65	6.65	8.45
Boston	7.23	8.23	9.52	44.78‖	7.47	...	7.20	8.60	12.45	7.49	7.37	8.50
Buffalo	6.35	7.40	8.84	....	6.70	...	6.50	7.90	12.20	6.77	6.70	7.80
Carnegie, Pa.	6.38	...	8.30	....	6.72	...	6.51	7.85	12.15	6.72	6.65	6.90
Charlotte, N. C.	6.95	7.80	8.69	....	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.38	7.38	8.30	43.55	6.62	...	6.51	7.50	11.90	6.69	6.52	7.64
Cincinnati	6.48	7.37	8.25	43.80‡‖	6.86	...	6.75	7.80	12.15	6.86	6.81	7.89
Cleveland	6.38	7.38	8.45	45.66	6.72	...	6.57	7.60	11.96	7.02	6.69	7.81
Detroit	6.57	7.57	8.58	41.50	6.90	7.36	6.79	7.79	12.10	7.16	6.80	7.83
Erie, Pa.	6.35	7.38	8.30	....	6.70	...	6.50	7.45‖	....	6.69	6.52	7.64
Houston	7.35	7.80	9.93	....	7.70	9.30	7.70	9.50	....	7.35	7.35	8.75
Los Angeles	7.40	9.25	9.80	50.15	7.75	11.75	7.35	10.05	13.20	7.55	7.35	9.45
Milwaukee	6.47	7.47	8.39	....	6.71	...	6.60	7.69	11.99	6.86	6.61	7.73
Moline, Ill.	6.73	7.73	8.65	....	6.97	...	6.86	7.85	....	6.81	6.87	...
New York	6.97	7.91	8.79	44.45	7.56	...	7.37	8.73‖	10.53	7.38	7.27	8.68
Norfolk, Va.	7.00	...	...	....	7.10	...	7.10	8.60	....	7.10	7.10	7.95
Philadelphia	6.19	7.13	8.09	41.98‖	6.96	8.80	6.74	8.19‖	11.96	6.54	6.49	7.51**
Pittsburgh	6.38	7.38	8.30	43.50	6.72	...	6.51	7.85	11.90	6.69	6.52	7.44**
Portland, Oreg.	7.60	8.75	9.70	48.50	7.85	...	7.55	10.95	14.00	7.50	7.45	9.35
Richmond, Va.	6.43	7.39	8.67	....	6.77	...	6.71	8.33	....	7.08	6.65	8.08
St. Louis	6.67	7.67	8.59	43.89	6.91	...	6.80	7.89	12.19	7.09	6.81	7.93
St. Paul	7.03	8.03	8.96	....	7.28	...	7.16	8.26	....	7.12	7.19	8.30
San Francisco	7.55	8.95	9.35	48.15	7.80	...	7.35	10.05	13.20	7.50	7.40	9.45
Seattle	8.10	9.80	10.15	50.50	8.20	...	7.80	10.95	13.85	7.75	7.80	9.60
Spokane	8.35	9.65‖	10.05	....	8.30	...	7.80	10.85‖	14.40	7.45	7.55	9.60
Washington	6.70	7.99	7.97	....	7.37	...	7.38	9.09	....	7.31	7.05	8.16

*Prices do not include gage extras; †prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extras excluded); ‡includes 35-cent special bar quality extra; §as rolled; **⅛-in. and heavier; ††as annealed. ‖‖plus $2 for crating. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over, except in Seattle where base is 2000 to 9999 lb; stainless sheets, 8000 lb except in New York and Boston where base is 10,000 lb. [2]—500 to 9999 lb; [4]—4000 lb and over; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 lb to 3999; [8]—under ½ in.; [9]—f.o.b. local delivery in lots of 10,000 lb and over.

Distributors' Sales Are Gaining

Improvement in warehouse business this month is expected to continue into the fall. Substantial small-lot orders likely will be booked to correct unbalanced inventories

Cleveland—Resumption of operations at various manufacturing plants has been followed by a slight quickening in demand on the warehouses. Volume, however, is not up sharply but the distributors anticipate steady improvement from here on. With consumers inclined to move cautiously in ordering from the mills, the warehouses think considerable small-lot business will come to them because of unbalanced consumer inventories. August warehouse business volume should better that of July, and, the pickup is expected to continue into the fall.

Philadelphia—Steel distributors in this district report business unchanged. Some doubt if August tonnage will better that of July, which was the slowest month of the year so far. Structurals are moving best of the major products carried in stock.

Chicago—Steel warehouses expect better sales volume this month than last. This is based on three factors. First is that warehouse orders have held up better than mill orders recently. Second is the assumption that inventory liquidation is over. Third is the fact fewer metalworking plants will be closed for vacations than was the case in July. Stocks of all products are in excellent condition.

Pittsburgh — July sales totals marked the year's low point for some distributors and demand has started to recover. Fabricators, opening after vacations, are frequently finding their stocks require replenishment.

Flat rolled products sell poorly. Cold-rolled sheet consumers appear overstocked. Structural shapes as well as tube and wire used in construction lead demand.

Boston — Orders placed with the mills, starting September, will be heavier, but on a fill-in replacement basis. Volume will closely match

STEEL IMPORT PRICES

(Base, per 100 lb, landed, duty paid)

	North Atlantic	South Atlantic	Gulf Coast	West Coast*
Deformed Bars, Intermediate, ASTM-A-305	$4.95	$4.95	$4.85	$5.23
Bar Size Angles	4.65	4.65	4.55	4.93
Structural Angles	4.65	4.65	4.55	4.93
I-Beams	4.50	4.50	4.40	4.73
Wide Flange Beams	4.80	4.80	4.80	5.08
Sheet and Plate, 10 gage, 11 gage, 5' x 10'	5.50	5.50	5.45	5.78
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	26.80	27.00	26.80	27.60
Barbed Wire	7.30	7.30	7.30	7.63
Merchant Bars	5.00	5.00	5.00	5.33
Hot-Rolled Bands	5.15	5.15	5.10	5.43
Wire Rods, Thomas Commercial No. 5	4.80	4.87	4.85	5.12
Wire Rods, O-H, Cold Heading Quality No. 5	5.23	5.30	5.28	5.55
Bright Common Wire Nails, 8d	6.85	6.95	6.90	7.15

*Not including $2.20 per net ton customarily charged in most West Coast ports for wharfage and handling.

Sizes OD				
Seamless A.P.I. Casing, Grade J-55:				
5½ in.	15.5	$1.47/ft	$1.51/ft	$1.32/ft
7 in.	23	2.10/ft	2.17/ft	1.90/ft
Seamless N-80 Casing:				
5½ in.	17	1.94/ft	2.00/ft	1.75/ft
7 in.	23	2.50/ft	2.70/ft	2.36/ft
Seamless J-55 Tubing:				
2⅜ in.	4.7	0.60/ft	0.63/ft.	0.55/ft
2⅞ in.	6.5	0.80/ft	0.83/ft	0.73/ft

Sources of shipment: Western continental European (Schuman Plan) countries.

warehouse sales. Forward buying is not anticipated so long as current prompt shipments are possible.

New York — Warehouse business this month is expected to hold at around the July level, which was the lowest so far this year. Currently, various consuming plants are down for vacations.

Cincinnati—July turned out to be about as good as June in the warehouse field. Dollar volume was up, reflecting higher prices. Business is spotty as vacations exert a strong influence on buying.

Los Angeles—Reflecting the recent mill price increase, warehouses in this area have hiked prices on a wide range of products. Hot-rolled sheets advanced 15 cents to $7.40; cold-rolled sheets up 25 cents to $9.25; hot-rolled strip is up 20 cents to $7.75; cold-rolled strip advanced 55 cents to $11.75. Prices on carbon plates are up 15 cents to $7.35, floor plates are up 20 cents to $9.45. Standard structural shapes advanced 20 cents to $7.55.

Seattle—Warehouse volume in the Pacific Northwest for the first six months of this year is estimated off 5.9 per cent compared with the corresponding period of last year, but some distributors report their business is equal to that of a year ago.

Semifinished Steel . . .

Semifinished Prices, Page 136

Boston—Open-hearth ingot production will be abandoned at the Worcester Works of American Steel & Wire Division, U. S. Steel Corp. Billets for finishing operations at the plant will be supplied from the new Fairless Works.

Four basic open hearths and auxiliary equipment, with annual ingot capacity of 300,000 tons, will be withdrawn. Finishing operations, rod and wire mills, electrical cable, spring mill and rail bond department will not be affected.

Since 1901 steel ingots have been produced at Worcester, the open hearths being built by Washburn & Moen Co., taken over at the time of organization of American Steel & Wire Co.

Each cold metal furnace has approximate capacity of 115 tons per heat.

Closing of the Worcester open hearths takes from the market the largest scrap and pig iron consumer in New England. Approximately 125,000 tons of scrap annually were consumed at the works. Pig iron has been supplied by various U. S. Steel blast furnaces supplemented by foreign iron purchased in 10,000-ton lots from time to time.

Galvanized Sheet Shipments Extended

Demand for coated product provides one bright spot in currently dull market for flat-rolled items. Mills see pickup in general buying as month advances

Sheet and Strip Prices, Page 136 & 137

Boston—Sheet and strip buyers are sharpening procurement policy in regard to extras. Whereas many formerly bought one grade for multiple purposes, frequently top drawing quality for all, more are now diversifying specifications, buying intermediate and commercial stock where application is satisfactory, thus avoiding higher extras up to $9 per ton. Pressure against prices when buying improves will be directed against extras.

The lag in orders, partly seasonal, is emphasized by model, design and product changes, notably automotive.

New York—Most leading producers of hot and cold-rolled sheets can make deliveries within two to three weeks. Only in galvanized, among the major items, do deliveries appear fairly extended. Some galvanized tonnage can be obtained in the East within 4 to 5 weeks, but the average for all producing companies is longer. Certain producers in the Midwest, with substantial grain storage bin tonnage on their books, can do nothing under 8 to 10 weeks.

Deliveries on top grades of electrical sheets also are well extended, although the low silicon sheets can be had within 3 to 4 weeks, in some cases.

Sellers look for little general improvement in sheet demand before September.

Philadelphia—Consumers are having no difficulty in obtaining hot-rolled sheets for delivery within 2 to 3 weeks and cold-rolled sheets within 4 to 5 weeks. They might be able to do still better on the latter.

Galvanized sheet delivery promises are more extended on the average. Some eastern production is still available within 5 to 6 weeks, but inland promises range from 7 to 12 weeks, primarily because of government grain bin tonnage.

Enameling stock shipments range 6 to 8 weeks.

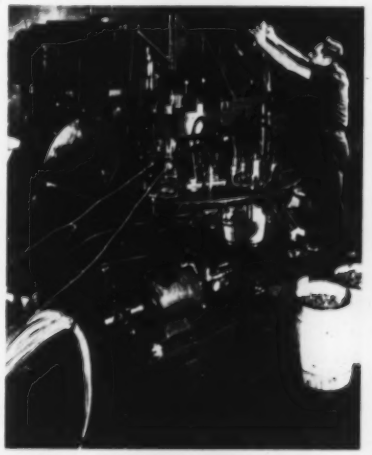
Pittsburgh—Flat-rolled steel sales are dull. Automakers have trimmed requirements for this month. Galvanized sheets are the only flat-rolled item in well-sustained demand.

Cleveland — Gradual improvement in demand for sheets and strip is expected as the month passes, but, generally, sellers in this area do not look for any particular surge in consumer interest until next month. Even then, some say active buying may be delayed until October, especially as regards automotive requirements since impending model changeovers will cause some deferments.

As in other areas, galvanized sheets appear to be under strongest pressure.

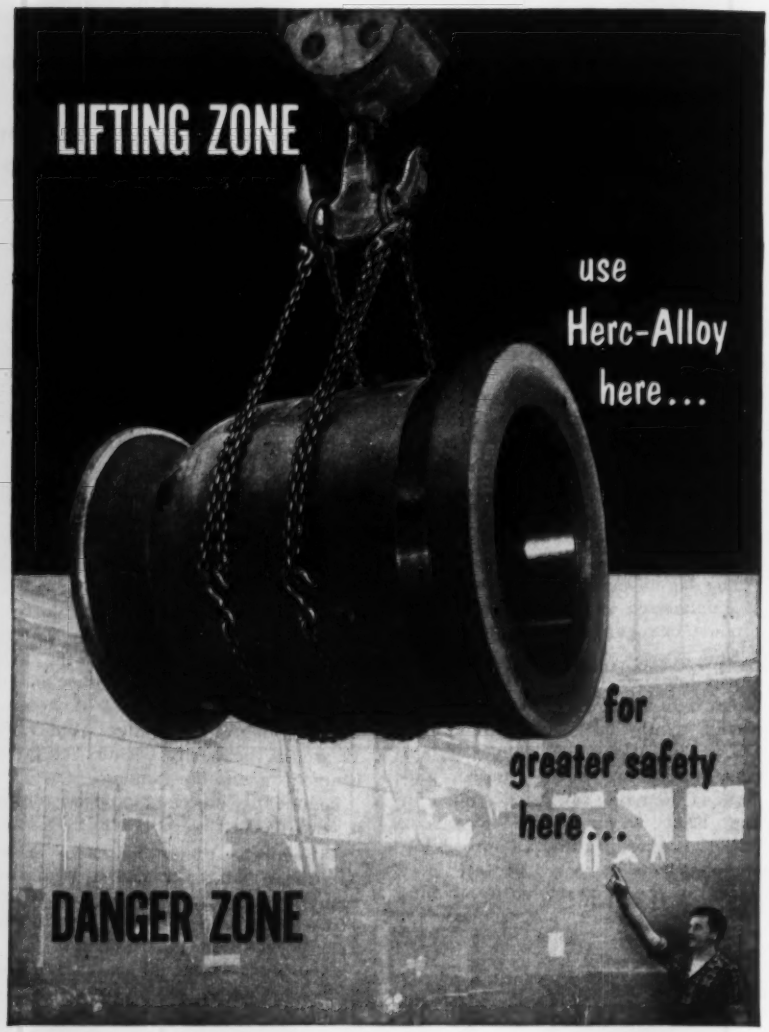
Chicago — Some sheetmakers believe August will see an upturn in buying. Two factors arguing in this direction are new grain bin needs, which will require substantial tonnages of galvanized sheets, and increasing intake of both hot-rolled and cold-rolled tonnage by automakers for new models.

St. Louis—Demand for cold-rolled sheets remains at low level. Mill order backlogs average no more than 30 days. International Harvester's curtailment has trimmed what had been a good portion of this market's strength.



Nylon Yoked with Steel

Republic Steel Corp. is coupling nylon with steel to make Nylok nuts. An operator at the firm's Bolt & Nut Division, Cleveland, is shown placing blank nuts in a machine which taps and drills hole in side of each nut and inserts nylon plug. The plug forces the nut tightly against the opposite thread as nut is turned on bolt. A reel of nylon is shown at the left



SPECIFY
HERC-ALLOY
SLING CHAINS

Write for Data Book

HERC-ALLOY Sling Chains are made-up to order, are individually tested, registered and guaranteed.

Hundreds of plants like the one shown above* are using Herc-Alloy Sling Chains. Greater safety is their big reason for doing it. But there are other factors too. Herc-Alloy is economical because of its long service life. Then too, the use of alloy steel permits a weight reduction that helps prevent worker fatigue. These advantages are worth thinking about. Those who do consider them seriously generally adopt safe Herc-Alloy Sling Chains for their plants.

*LAKE ERIE ENGINEERING CORPORATION — MANUFACTURER OF HYDRAULIC PRESSES

CM HOISTS AND CHAIN

COLUMBUS McKINNON
CHAIN CORPORATION
TONAWANDA, NEW YORK
DISTRICT OFFICES: NEW YORK, CHICAGO, CLEVELAND
In Canada: McKINNON COLUMBUS CHAIN LIMITED, ST. CATHARINES, ONTARIO

Plates . . .

Plate Prices, Page 136

Philadelphia—Central Iron & Steel Co., Harrisburg, Pa., has advanced prices on carbon plates $2.50 per ton, effective Aug. 2, bringing it within $5 a ton of other district producers, who earlier in the summer increased their prices similarly. The new price at Central is $3.975 f.o.b. mill. No change was announced on floor plates.

Plate demand is light with little early change anticipated. However, prospects for improved ship demand later are better.

Boston—Contracts for Navy ships include seven destroyers placed with New England yards; also two additional atomic submarines to be constructed at Portsmouth, N. H., and Groton, Conn. Not much additional plate volume will be required until first quarter, next year.

Carbon plate buying is slow; with deliveries down to two weeks, fabricating shops are taking in only tonnage to meet booked requirements. Tank bookings are off.

Pittsburgh—Tank work and large-diameter pipe line applications for plates have been declining. Large tonnages are needed in construction, but over-all sales continue to decline. Defense requirements remain at a low level.

Chicago—Plate demand has eased off somewhat but still is substantial. A good volume is going to the construction field which remains exceedingly active.

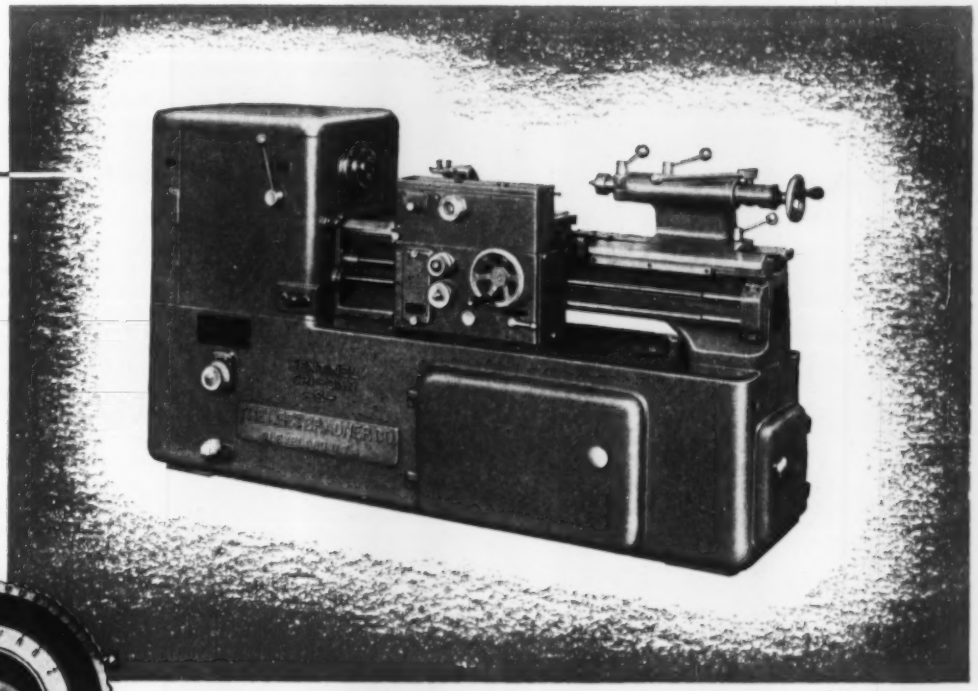
Steel Bars . . .

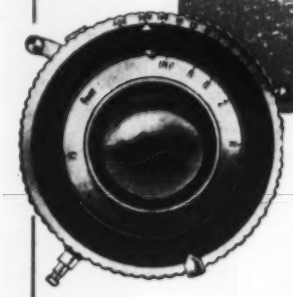
Bar Prices, Page 136

Pittsburgh—Barmakers report dull markets for hot-rolled and cold-finished bars. Alloy bar sales to farm equipment makers also are slowing. There is no change in defense requirements. While August appears to be another slow month, indications are sales will gain in September.

Cleveland — Merchant bar buyers are watching their inventories closely. This is evidenced by the fact that while the bar mills are in receipt of a substantial number of orders, practically all of them call for small tonnage. Whereas formerly consumers carried two, three and four months stocks, they are now carrying only 30 or 40 days' supplies.

Boston—Carbon and alloy bar orders are light, mostly for prompt shipment with September volume low. Consumer inventories are down and





CRI-DAN BRIGHTENS THE PRODUCTION PICTURE AT Eastman Kodak

Over a half-million lens mounts for Kodak cameras have been threaded on the Cri-Dan "B" during the past year. This fact, coupled with the extreme precision demanded in camera manufacture, dramatically proves that CRI-DAN Threading Machines combine accuracy and speed to an extent heretofore unknown.

Key to CRI-DAN's efficiency is the single carbide point tool which threads with unusual speed and accuracy. Changeover is fast and tool cost low.

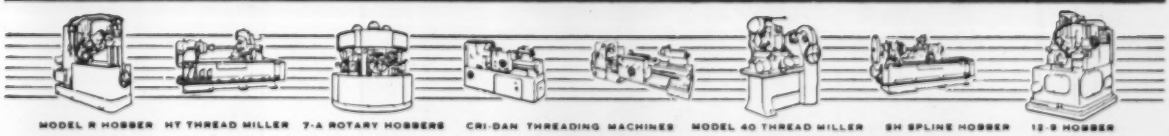
Take steps now to brighten your production picture. Get all the facts on CRI-DAN Threading Machines from your Lees-Bradner representative, or write direct.

CAPACITIES

Spindle Speed (In 24 Steps)	145 - 2800 RPM
Swing Over Saddle	4"
Swing Over Bed	13"
Capacity Between Centers	36"
Max. Thread Length	2½"
Max. Diameter Thread	4"
Rated Max. Capacity	10 TPI
Max. No. of Thread Starts	12
Max. Taper Thread	25° Incl.
Max. No. Passes Per Thread	32

the LEES-BRADNER Company

CLEVELAND 11, OHIO, U.S.A.



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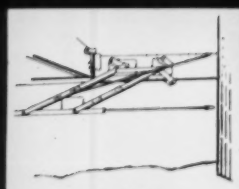
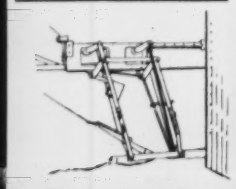
IF YOU THREAD OR HOB . . . GET A BETTER JOB WITH A LEES-BRADNER

Bailey
Cinder Notch Stopper



Stopper in "out" position.



Position after cinder notch has been closed.

keeps workmen out of a danger zone

Since the Bailey Stopper is controlled remotely, no workman need approach the cinder notch—assuring safe, dependable closing every time. Gravity action inserts the bott in the monkey, and an air or steam powered cylinder withdraws the stopper to the "out" position. Design is such that alignment is true at all times. For durability, both the bott and rod are water-cooled.

WILLIAM M. Bailey COMPANY
ENGINEERS
LEADERSHIP THROUGH QUALITY
1221 BANKSVILLE ROAD PITTSBURGH 16, PA

any lag in promised shipment brings out pressure for delivery.

New York—Hot carbon bar producers say there is virtually nothing they can't work into their first rollings—whether rounds or flats or whatever form, and whatever size. They are all looking for tonnage and this applies to cold-drawn and hot carbon material as well as alloys, both hot and cold.

Philadelphia—With little or no improvement in demand, hot-rolled carbon bar deliveries remain easy. There is not a producer who cannot work in tonnage for first rolling. This means that on an average consumers are having little difficulty obtaining most any specification desired within a period of two weeks or so, especially by shopping around a bit.

Most cold-drawn bar producers are building up their inventories of hot-rolled bars on an increasing range of sizes, with the result that they, too, can make fairly nearby deliveries in a number of cases.

The situation in alloy bars continues easy.

Chicago—Bar shipments are not expected to come up to July tonnage, contrary to earlier expectations. Resumption of manufacturing plants which closed down last month for vacations were figured to send demand up moderately.

Wire . . .

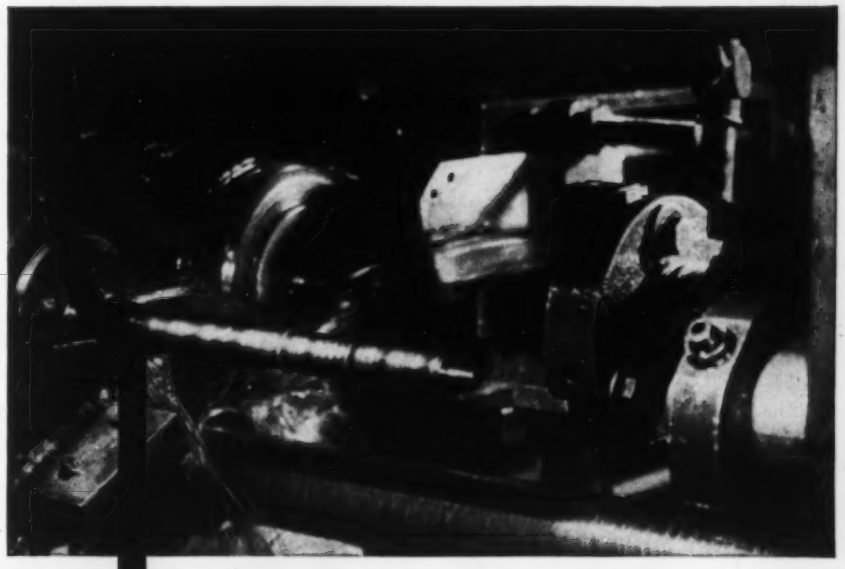
Wire Prices, Page 138

Boston — Carbon wire orders are picking up slowly. Furniture spring users are placing some fourth quarter volume, but most are yet to be heard from. Auto model changes and new designs for other consumer goods, including appliances, are likely to delay volume buying until October.

The traditional nail keg appears on the way out as a shipping container. Starting this month, 100 pound nail shipments from the Worcester plant, American Steel & Wire Division, U. S. Steel Corp., are in fibre containers. Gross weight is several pounds lighter.

Pittsburgh — Manufacturers wire sales dipped in July but should make up some of the decline this month. Automakers and auto equipment manufacturers' requirements last month were lower, and sales to those groups reached a low point for the year.

Chicago—Merchant wire products are selling sluggishly due principally to the fact farmers are devoting their time to field work and thus are doing little maintenance.



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Make them out of ENDURO Stainless Steel Cold Drawn Bars. Then you get high production rates from your automatics, plus all the high physical and chemical properties you want from stainless steel.

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Valve stems are made of ENDURO Cold Drawn Types 410 and 416. And Edward methods engineers say they get good production for these reasons:

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2. **Surface finish is excellent**
3. **Tool life is longer, down-time for re-grinding is less**

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CURRENT FERROALLOY QUOTATIONS

Prices as reported to STEEL

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.
(16 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C7% approx.) Base price per net ton $200, Clairton, Duquesne, Johnstown and Sheridan,Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; and Portland, Oreg.; add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $208 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 27.95c per lb of contained Mn, carload packed 28.7c, ton lots 29.8c, less ton 31.0c. Delivered. Deduct 0.5c for max 0.15% C grade from above prices, 1c for max, 0.30% C, 1.5c for max 0.50% C, and 4.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload; lump, bulk, 36.2c per lb of metal; packed, 36.95c; ton lot 38.45c; less ton lots 40.45c. Delivered. Spot, add 2c.

Electromanganese: Min carloads, 30c; 2000 lb to min carloads, 35c; 250 lb to 199 lb 34c; less than 250 lb, 37c. Premium for hydrogen-removed metal, 0.75c per lb, f.o.b. cars, Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-85%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.00c per lb or alloy, carload packed, 11.75c, ton lots 12.65c, less ton 13.65c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.
Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, C.l., lump, bulk 24.75c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max, 0.025% C (Simplex) 34.50c per lb contained Cr, 0.03% C 36.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. 8 M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8 M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 24.75c per lb of contained chromium plus 10.8c per pound of contained silicon; 1" x down, bulk 25.25c per pound of contained chromium plus 11c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min 97% Cr and 1% Fe) contract, 1" x D; packed, max 0.50%, carload $1.12, ton lots $1.14; less ton $1.16. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 4c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max, C 0.5-1% max). $3.10. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 10.80c per lb of contained Si, carload packed 12.40c, ton lot 13.85c, less ton 15.5c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.7c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 12.2c per pound contained silicon; carload packed 13.55c; ton lots, 14.75c; less ton, 16.1c, delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.8c per lb of contained Si, carload packed 15.1c, ton lot 16.25c, less ton 17.5c. Delivered. Spot, add 0.8c.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.0c per lb of contained Si, carload packed 18.2c, ton lot 19.15c, less ton 20.2c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 97% Si and 1% max Fe) C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max, 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.25c per lb of alloy, ton lots packed 10.15c, 200 to 1999 lb 10.50c, smaller lots 11c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min M) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.25c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.45c per lb of briquet, c.l. packaged 13.25c, ton lot 14.05c, less ton 14.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.65c per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.3c per lb of briquet. Packed c.l. 7.10c, ton lot 7.9c, less ton 8.8c. Delivered. Spot, add 0.25c.
(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.45c. Packed c.l. 7.25c, ton lot 8.05c, less ton 8.95c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.80 per lb of contained W; 2000 lb W to 5000 lb W, $3.90; less than 2000 lb W, $4.02, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $9.50 per lb of contained Cb, less ton $9.55. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $4.75 per lb of contained Cb plus Ta, deld.; less ton lots $4.80.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy; ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 16.6c per lb of alloy; ton lots 18.10c; less ton lots 19.35c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 15.50c. Packed c.l. 16.50c, 2000 lb to c.l. 16.75c, less than 2000 lb 17.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Bigio, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, f.o.b. Langeloth, Pa., $1.32 in all sizes except powdered which is $1.41; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.14 in cans; in bags, $1.13, f.o.b. Langeloth, Pa.; Washington, Pa., $1.13.

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1. **As the world's highest quality ramming mix for open hearth bottoms, Permanente 165 *lasts far longer* than other materials.**
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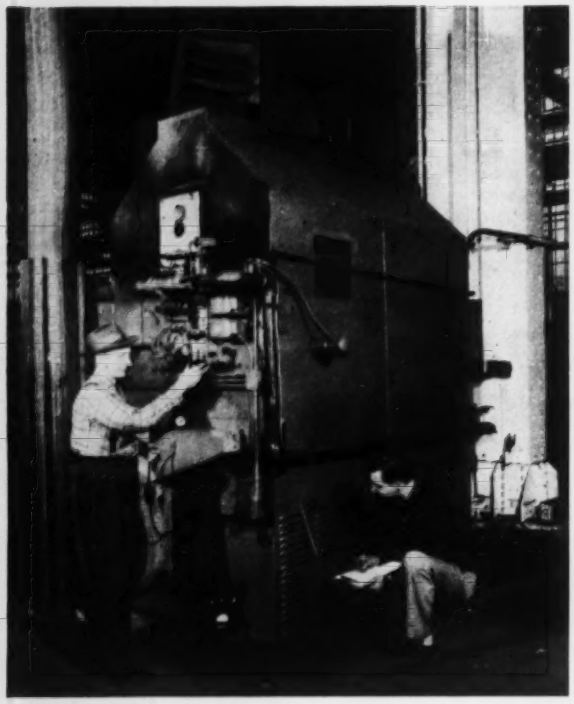

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Most industrial warm-air space heaters have to be replaced after eight to ten years of service. Not so with Dravo Heaters!

Dravo's Research Department tested a *Counterflo* Heater to determine mechanical and physical endurance. This heater was operated on an accelerated schedule equal to 17 years. That's 70% *longer* than the average life of a comparable type warm-air space heater. Metallurgical inspection of the stainless steel combustion chamber showed no appreciable physical deterioration. Minute inspection of component parts showed only normal expected use.

You get this 70% *extra life* from Dravo Heaters because of their engineered design and construction. Dollar for dollar and year for year of operation, your best heating investment is Dravo Heaters.

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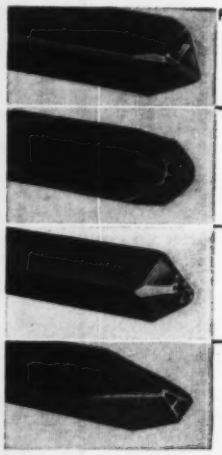

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Made for the toughest steel mill marking. Ideal for stamping on rails, billets, ingots, etc.

ARMOR PLATE "DUO-LIFE" STAMPS
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By Albert Portevin

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69 illustrations **Price $5.00 Postpaid**

THE PENTON PUBLISHING CO.
Book Department, 1213 W. 3rd St., Cleveland 13, O.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 136

Seattle — Northwest Steel Rolling Mills Inc., Seattle, booked 1000 tons of reinforcing bars for approaches to the state highway Chehalis river bridge. Award of 500 tons for a Skagit county road project is pending. Washington state highway projects, bids Aug. 17, involve 175 tons of reinforcing.

Tin Plate . . .

Tin Plate Prices, Page 138

Chicago — Tin plate business is holding up well despite the fact canmakers did considerable buying in second quarter as a hedge against a steel strike.

Tubular Goods . . .

Tubular Goods Prices, Page 139

New York—Detailed requests for bids from the nation's major steel companies for American Pipe Line's 437,000 ton 24 and 26-inch pipeline from Beaumont, Tex., to Newark, N. J., have been requested by William E. Jeffrey, New York manager, Engineers Ltd., supervising design and construction work.

Boston—Direct shipment seamless pipe tonnage this month will be down following substantial July movement due to airfield base demands. Buttweld pipe is slow.

Pittsburgh — Tubemakers predict continued brisk standard pipe sales. Demand from jobbers is holding up well. At the same time, sales of mechanical tubing are slipping.

Iron Ore . . .

Iron Ore Prices, Page 151

Washington—Production and shipments of iron ore in the United States during May increased sharply as compared with the preceding month, but were off sharply from a year ago, reports the Bureau of Mines.

Production of 9,817,734 gross tons more than doubled April output, but it was 31 per cent below that of May, 1953. Shipments of 10,573,029 tons were 3 times greater than in April but 30 per cent below May of last year.

Imports increased in the month 20 per cent over those of April, and the total for the first 5 months was up 27 per cent compared with the like 1953 period. During May, 1,119,389 tons were imported, bringing the total for the year through the first five months to 4,526,650 gross tons.

Cleveland — Iron ore shipments

ORES–COKE–REFRACTORIES

Prices as reported to STEEL; changes shown in italics.

ORES

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit deld. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	20.00
N. African hematite (spot)	*nom. 20.00-22.00*
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, before duty

Foreign Wolframite, good commercial quality	$24.00-$25.00
Domestic scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, $1.02-$1.05 per long ton unit c.i.f. U. S. ports, duty for buyer's account; *46-47%, 93c-95c.*

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.8:1	*nom. $40.00-$42.00*
48% 3:1	*42.00-44.00*
48% no ratio	32.00-34.00
South African Transvaal	
44% no ratio	*$19.00-$20.00*
48% no ratio	*nom. 34.00*
Domestic (Rail nearest seller)	
18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb. Mo content mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

50-60%	*$3.80-$4.20*
60-65%	*4.65-4.75*

Vanadium Ore

Cents per lb. V_2O_5 content, deld. mills

Domestic	31.00

REFRACTORIES

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $89; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $109; Salina, Pa., $114; Niles, O., $120; Los Angeles, Pittsburg, Calif., $132.30.

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $115; Warren, Niles, O., Hays, Pa., $120; E. Chicago, Ind., Joliet, Rockdale, Ill., $125; Cutler, Utah, $116.55; Los Angeles, $122.85.

Insulating Fire Brick

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala. $212.80.

Ladle Brick

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Wellsville, O., $77.50; Mexico, Mo., $73.50; Clearfield, Pa., Portsmouth, O., $83; Peria, Ark., $109; Los Angeles, $110.25; Pittsburg, Calif., $111.30.

Sleeves

Reesdale, Pa., $139.70; Johnstown, Pa., $140; Clearfield, Pa., $148.50; St. Louis, $151.80; Athens, Tex., $155.

Nozzles

Reesdale, Pa., $223.50; Johnstown, Pa., $229.20; Clearfield, Pa., $241.40; St. Louis, $247.10; Athens, Tex., $247.70.

Runners

Reesdale, Pa. $174; Johnstown, Pa., $177.80; Clearfield, Pa., $185.50; St. Louis, $187.30; Athens, Tex., $191.80.

High-Alumina Brick

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $179; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $223.00; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $225; Danville, Ill., $258; Clearfield, Pa., $252.

Dolomite

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Nario, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $14.60; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite

Domestic, deadburner bulk; Luning, Nev., $38.

METALLURGICAL COKE

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.50-$15.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearney, N. J., ovens	$24.00
Everett, Mass., ovens	
New England, deld.	*26.05
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Chicago, deld.	28.12
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	25.00
Buffalo, deld.	26.25
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	23.00
Swedeland, Pa., ovens	23.00
St. Louis, ovens	
St. Louis, deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, deld.	26.62
Detroit, ovens	25.50
Detroit, deld.	26.50
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol	40.00
Toluol, one deg	32.00-35.00
Industrial xylol	32.00-35.00
Per ton, bulk, ovens	
Sulphate of ammonia	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

FLUORSPAR

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $44; 70%, $42.50; 60%, $38. Imported, net ton, duty paid, metallurgical grade, $35-$36.

ELECTRODES

(Threaded with nipple, unboxed f.o.b. plant)

GRAPHITE

Diam.	Length	Per 100 lb
	Inches	
2	24	$43.50
2½	30	28.00
3	40	27.25
4	40	26.00
5½	40	25.75
6	60	23.25
7, 8, 9, 10	60	21.00
12, 14	72	20.50
16	72	20.00
17	60	20.50
18	72	20.50
20	72	20.00

CARBON

40	100	$8.95
40, 35, 30	110	8.95
30	84	9.10
24	96	8.90
24	72, 84	9.10
20	90	8.95
20	84	9.10
17	72	9.10
17	60	9.50
14	72	9.50
14, 12, 10	60	10.30
8	60	10.55

from the head of the lakes continue to run almost 1 million tons weekly behind last year's record movement. Shipments in the latest week of record, that ended Aug. 2, totaled 2,249,538 gross tons, reports the Lake Superior Iron Ore Association. This compares with 3,224,190 tons moved in the corresponding week of 1953.

Shipments this season to Aug. 2 now total 33,480,917 gross tons. Last year up to Aug. 2 cumulative shipments were 51,309,044 tons.

Plans are under way to take some of the currently active ships of the lake ore fleet out of service within the next month or so. Reflecting curtailed steel operations and resulting lessened demand for iron ore and large stocks at lower lake ports, the Pittsburgh Steamship Division, U. S. Steel Corp., plans to lay up 15 of its lake fleet of 59 vessels shortly after Sept. 1. The company will not lay up any additional ships, however, prior to Nov. 1.

New York—Republic Steel Corp. suspended operations at its Chateaugay iron mine at Lyon Mountain, N. Y., last week for at least two months, due to "lack of orders".

New York—Sale of foreign controlled iron ores in this country continues light, reflecting heavy stocks on this side—stocks that are large not only because of a decline in consumption but also because of a steadily expanding movement from American controlled properties in South America, Africa and, more recently, Canada. Demand for Swedish and Brazilian iron ores is spotty and for North African hematite virtually nil, with prices purely nominal.

Demand for foreign manganese ore also is limited with prices on 46 to 47 per cent ore easier at $0.93-$0.95 per long ton unit, c.i.f., U.S. ports, duty for buyers' accounts.

Demand for chrome ore still lags. But one in fairly tight supply is South African Transvaal, 44 per cent no ratio. This is ascribed in part to shortage of cars for transporting the ore from the mines to the seaboard and, to the fact that importers are behind on their contracts, as a result.

Also, it is said demand for this grade has been greater because of requirements for producing some of the lower types of alloys. However, prices are off about $2 a ton as a result of lower ocean rates. Prices on most other grades are nominal.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

14,800 tons, superstructure, Kingston-Rhinecliff bridge across the Hudson river, New York State Bridge Authority, to Harris Structural Steel Co., New York.

5300 tons, Supreme Court building, Brooklyn, N. Y., through Wininger Construction Corp., Rockefeller Plaza, Manhattan, New York, general contractor, to Bethlehem Steel Co., Bethlehem, Pa.

2200 tons, double cantilever maintenance hangar, Larson Air Field, Moses Lake, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle; general contract awarded by U. S. Engineer in April to Donald M. Drake Co., Portland, Oreg., low $2,215,933.

1300 tons, structural steel and wire rope, gas line suspension bridge, Mississippi river, Grand Tower, Ill., for Texas Illinois Natural Gas Pipeline Co., Chicago, to American Bridge Division and American Steel & Wire Division, U. S. Steel Corp., Pittsburgh; this was previously reported as 300 tons.

1300 tons, factory building, Leeds & Northrup Co., North Wales, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

1200 tons, state bridges, Dedham-Wellesley-Norwood, Mass., to American Bridge Division, U. S. Steel Corp., Pittsburgh, (775 tons) and West End Iron Works, Cambridge, Mass. (balance); Turausi Construction Co., Boston, is general contractor.

1200 tons, four hangars, Air Base, Dover, Del., to Lehigh Structural Steel Co., Allentown, Pa.

1025 tons, state turnpike bridge, Lehigh county, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

400 tons, marine terminal, Camden, N. J., to Belmont Iron Works, Eddystone, Pa.

250 tons, factory, Enamelstrip Corp., to Bethlehem Fabricators, Bethlehem, Pa.

150 tons, pipeline supports, Shell Oil Co. refinery, Anacortes, Wash., to Isaacson Iron Works, Seattle.

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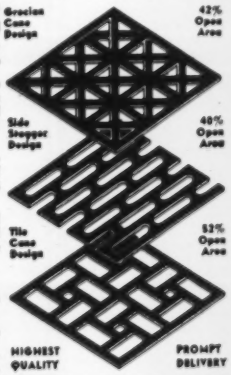

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STRUCTURAL STEEL PENDING

3000 tons, navigation locks, The Dalles dam, Columbia river; bids to U. S. Engineer, Portland, Oreg., Aug. 31.

3000 tons, refinery structure for Shell Oil Co., Anacortes, Wash.; bids in to the Bechtol Corp., San Francisco, July 28.

2100 tons, grade crossing elimination, Lincoln Square project; V. Barletta Co., Roslindale, Mass., low; also 965 tons, reinforcing, including 700 tons of mesh.

2000 tons, changes to approaches and reconstruction of main span, Third Avenue bridge over the Harlem river, Department of Public Works, New York, Terry Contracting Co., that city, low on general contract.

1300 tons, New York state office building, Syracuse, N. Y., F. B. Rich, New York, low on general contract.

240 tons, galvanized steel items for substations; bids to Bonneville Power Administration, Portland, Oreg., Aug. 13.

190 tons, administration building and offices, Shell Oil Co. refinery project, Anacortes, Wash.; bids in.

180 tons, addition, Olympia Brewing Co., Olympia, Wash.; A. G. Homann, Lacy, low $435,840 on general contract; conveyor system also involved.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1000 tons, approaches, Washington state Chehalis river bridge, to Northwest Steel Rolling Mills Inc., Seattle; Manson Construction & Engineering Co., Seattle, general contractor, low $1,283,265.

110 tons, Washington state highway paving, Chehalis river, to Bethlehem Pacific Coast Steel Corp., Seattle.

PLATES . . .

PLATES PLACED

370 tons, 18 vegetable oil tanks, to Hammond Iron Works, Provo, Utah, low $188,448 by Port of Seattle.

100 tons, 144-ft floating tank roof for Richfield Oil Corp. to Chicago Bridge & Iron Works, Seattle.

PLATES PENDING

4300 tons, sheet piling for Seward, Alaska, marine terminal; bids to General Services, Seattle, Aug. 18.

300 tons, 3-million-gal. water tank; bids to Renton, Wash., Aug. 10.

100 tons, 3800-ft, 36-inch water pipe; bids to Pend Oreille P.U.D., Newport, Wash., Aug. 23.

PIPE . . .

CAST IRON PIPE PENDING

300 tons, 8 and 6-inch Class 150; bids to Renton, Wash., Aug. 10.

150 tons, 9700-ft 8-inch, installation bids to Monmouth, Oreg., Aug. 10; materials furnished by city.

RAILS, CARS . . .

RAILROAD CARS PLACED

Chicago & Illinois Midland, 150 fifty-ton box cars to ACF Industries, New York.

Delaware, Lackawanna & Western, 1000 fifty-ton box cars, divided equally between Magor Car Corp. and ACF Industries Inc., both of New York.

Great Northern, 25 seventy-ton gondolas, to own shops.

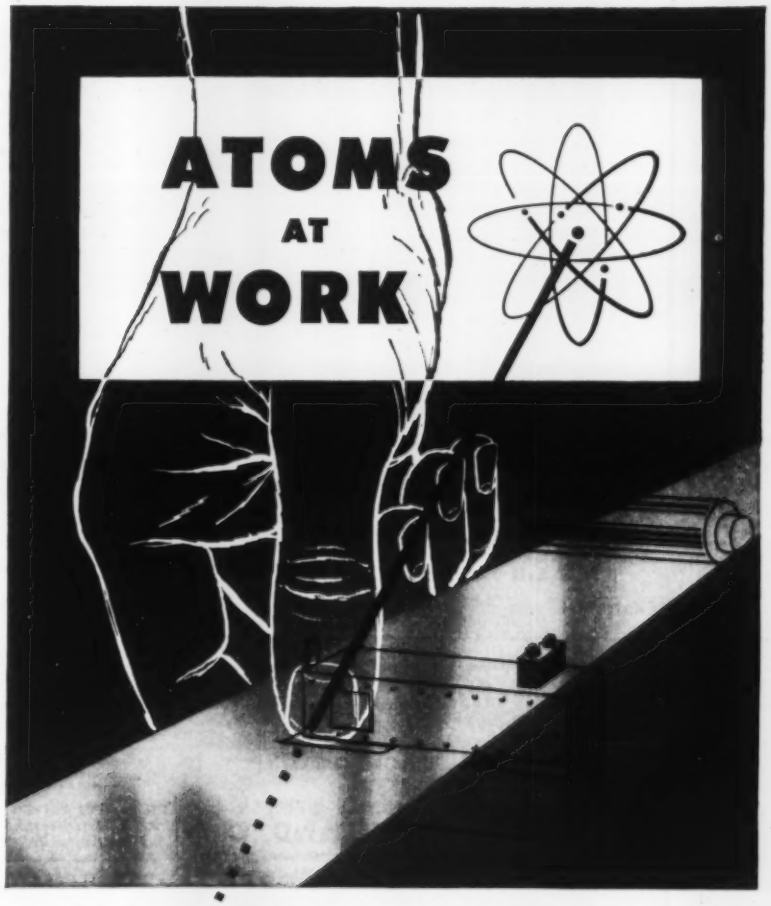
Nevada Northern, four steel cabooses, to Rail & Industrial Equipment Co.

RAILROAD CARS PENDING

New York Board of Transportation, subway cars, bids scheduled to be closed early in September; estimates are being asked on lots of 150, 200, 300 and 400 cars.

Pennsylvania, 200 piggy-back flat cars, new bids asked; order for a similar number was tentatively placed a few weeks ago but subsequently held up because of changes in design.

Union Pacific, 53 passenger cars, pending.



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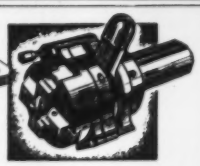

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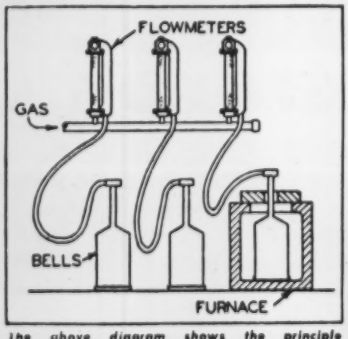
Pacific Coast Representative: A. C. Berbringer, 334 N. San Pedro St., Los Angeles, California. Canada: F. P. Barber Machinery Co., Toronto, Canada.



The above diagram shows the principle of operation of AGF FLOW METERS.

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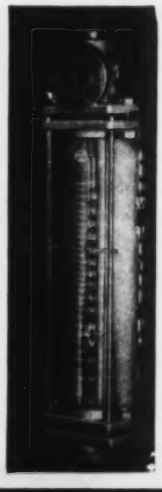

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For NI-Carbing* and Gas Carburizing in rotary and vertical retort carburizers, these meters permit maintenance and duplication of atmosphere gas flows.

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Made by the PIONEERS in gas furnace equipment.

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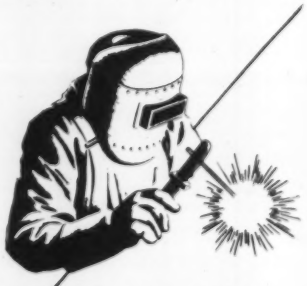

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You advertise in STEEL to reach ALL 4 buying influences . . . management, production, engineering, purchasing.

Exports Strengthen Scrap in East

Domestic delivered prices on No. 1 grades advanced in district as additional purchases for shipment abroad are made. Market in general dull with prices unchanged

Scrap Prices, Page 156

Philadelphia—Reflecting additional purchases for export, No. 1 heavy melting steel, No. 1 bundles and No. 1 busheling are now being quoted at $26, delivered, district consumer plant, and No. 2 heavy melting $24.

While there has been little domestic buying, sellers appear to be holding firmly at around these levels, with the export market still higher. There has been no change in No. 2 bundles, however.

Recently three part cargoes left here for Spain, with another shipment being loaded for another European destination.

Some domestic buying of electric furnace bundles has been done recently at $27, delivered, an increase of $2 a ton and of machine shop turnings at $15, an advance of $1 a ton. Heavy turnings have been bought at an increase of $1 a ton, or $23, delivered.

Other steel items are unchanged. Cast grades also are generally unchanged, although good grades of drop broken machinery are in active demand, with the market strong at $41 delivered. Malleable, on the other hand, is in particularly slow demand, and nominally unchanged at $37.

New Yrok—Brokers have advanced buying prices on No. 1 heavy melting steel and No. 1 bundles $1 a ton to $21. Similarly, they have increased prices on No. 2 bundles to a range of $14 to $15.

Strength is based on continued foreign demand rather than on domestic market interest. No. 2 heavy melting is unchanged at $17 to $18. In fact, all other grades are unchanged, including cast iron and stainless steel scrap.

Detroit—Scrap moved up slightly here last week as generation dropped at many major sources creating some spot shortages. However, over the next few months, observers can see no indication that scrap will not drop in the face of declining steel production and with model changeovers in the offing.

Buffalo — Although easier tendencies are apparent in the scrap market here additional mill buying interest is reported in steelmaking grades. Dealers are shipping on orders placed at the extremes of current price ranges. Sentiment varies with respect to future prospects. Water receipts continue light.

Pittsburgh — Despite moderate trading, heavy melting scrap price held unchanged last week. Sales are low, but a firmer market tone is developing due to expected increased industrial activity next month. Short shoveling turnings and machine shop turnings prices are up $1 a ton on the basis of a sale to an area mill.

Chicago—A leading steelmaker in this district has reaffirmed prices it will pay for scrap for August receipt. The prices for material of industrial origin only are $32 per gross ton, delivered for No. 1 factory bundles, $31 for No. 1 heavy melting steel and $33 for plate scrap.

These prices, same as those on July receipts, serve as a stabilizing influence on the grades covered. Recent buying has been very light. But it leaves dealer scrap untested in a listless market. A steelmaking rate continuing at below 70 per cent of capacity is a weakening influence too.

Boston—Combination of expert buying and lower freight on 40-ton minimum shipments have strengthened No. 1 heavy melting steel. For ship loading, depending on freight, brokers are paying $19, up $1.50 a ton. For grades difficult to load to the 40-ton minimum, prices are less.

Domestic buying is light with business with the Worcester mill at standstill. Yards are paying $11 to $12 for unprepared steel. Cast grades move in small lots at steady prices.

An important development with especial significance for scrap is discontinuance of open hearth ingot production at the Worcester Works, American Steel & Wire Division, U. S. Steel Corp. These open hearths provided the largest outlet for steel scrap and pig iron in New England. Approximately 125,000 tons of scrap annually were consumed at the plant. Pig iron has been supplied by various U. S. Steel blast furnaces, supplemented by foreign iron in 10,000-ton lots from time to time.

Cincinnati — Reduction in freight rates by 50 cents a ton to a mill north of here has resulted in a 50 cent increase in all No. 1 open hearth grades to $25.50 to $26.50. No. 1 bundles also rose 50 cents to $22.50 to $23.50. No. 1 railroad heavy melting advanced $1 to $30 to $31. Since one mill is buying by specific lots, its purchases are not having much effect on the market. Although the industrial lists are up $1 to $2, it is not felt the market will be stronger here.

St. Louis—The scrap market is so dull many brokers are working short office hours. Price quotations are so flexible as to be meaningless, the sale figure depending on which

(*Please turn to page* 158)

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IRON AND STEEL SCRAP

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Aug. 4	$28.50
July 28	27.33
July Avg.	27.42
Aug., 1953	43.40
Aug., 1949	20.86

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	*29.00-30.00*
No. 2 heavy melting	*26.00-27.00*
No. 1 bundles	*29.00-30.0*
No. 2 bundles	23.00-24.00
No. 1 busheling	28.00-29.00
Machine shop turnings	*15.00-16.00*
Mixed borings, turnings	*15.00-16.00*
Short shovel turnings	*19.00-20.00*
Cast iron borings	*19.00-20.00*
Cut structurals	29.00-30.00
Heavy turnings	26.00-27.00
Punchings & plate scrap	32.00-33.00
Electric furnace bundles	30.00-31.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Charging box cast	32.00-33.00
Heavy breakable cast	*30.00-31.00*
Unstripped motor blocks	23.00-24.00
No. 1 machinery cast	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00
Rails, 2-ft and under	43.00-44.00
Rails, 18-in. and under	*44.00-45.00*
Rails, random lengths	37.00-38.00
Railroad specialties	34.00-35.00

Stainless Steel Scrap
(F.o.b. shipping point)

18-8 bundles & solids	165.00-170.00
18-8 turnings	85.00-90.00
430 bundles & solids	65.00-70.00
430 turnings	50.00-52.00

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	*27.00-28.00*
No. 2 heavy melting	*25.00-26.00*
No. 1 bundles	*27.00-28.00*
No. 2 bundles	*23.00-24.00*
No. 1 busheling	*27.00-28.00*
Machine shop turnings	12.00-13.00
Mixed borings, turnings	16.00-17.00
Short shovel turnings	16.00-17.00
Cast iron borings	16.00-17.00
Low phos.	*28.00-29.00*
Cut structural plate 2 ft and under	*32.00-33.00*
Alloy free, short shovel turnings	16.50-17.50
Electric furnace bundles	*28.00-29.00*

Cast Iron Grades

No. 1 cupola	40.00-41.00
Charging box cast	26.50-27.50
Stove plate	33.00-34.00
Heavy breakable cast	25.50-26.50
Unstripped motor blocks	25.00-26.00
Brake shoes	29.00-30.00
Clean auto cast	42.00-43.00
No. 1 wheels	*34.50-34.50*
Burnt cast	27.00-28.00
Drop broken machinery	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt.	*31.00-32.00*
R.R. malleable	*41.00-42.00*
Rails, 3-ft and under	*43.00-44.00*
Rails, 18 in. and under	*45.00-46.00*
Rails, random lengths	*40.00-41.00*
Cast steel	*34.00-35.00*
Railroad specialties	34.00-35.00
Uncut tires	*36.00-37.00*
Angles, splice bars	41.00-42.00
Rails, rerolling	*45.00-46.00*

Stainless Steel
(F.o.b. shipping point)

18-8 bundles, solids	nom. 160.00-170.00
18-8 turnings	nom. 70.00-80.00
430 clips, bundles, solids	nom. 70.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	*29.00-30.00*
No. 2 heavy melting	*26.00-27.00*
No. 1 bundles	*29.00-30.00*
No. 2 bundles	*24.00-25.00*
Machine shop turnings	13.00-14.00
Short shovel turnings	19.00-20.00
Cast iron borings	19.00-20.00
Low phos.	*30.00-31.00*
Electric furnace bundles	*30.00-31.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*31.00-32.00*

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	*26.00*
No. 2 heavy melting	*24.00*
No. 1 bundles	*26.00*
No. 2 bundles	19.00-20.00
No. 1 busheling	*26.00*
Electric furnace bundles	*27.00*
Machine shop turnings	*15.00*
Mixed borings, turnings	16.00
Short shovel turnings	18.00
Structurals & plate	29.00-30.00
Heavy turnings	*23.00*
Couplers, springs, wheels	32.00
Rail crops, 2 ft & under	42.00

Cast Iron Grades

No. 1 cupola	35.00
Malleable	37.00*
Heavy breakable cast	35.50
Unstripped motor blocks	nom.
Drop broken machinery	41.00

*Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*21.00*
No. 2 heavy melting	17.00-18.00
No. 1 bundles	*21.00*
No. 2 bundles	*14.00-15.00*
Machine shop turnings	5.00-6.00
Mixed borings, short turnings	8.00-9.00
Low phos. (structural & plate)	22.00-23.00
Short shovel turnings	9.00-10.00

Cast Iron Grades

No. 1 cupola	29.00-30.00
Unstripped motor blocks	19.00-20.00*

Stainless Steel

18-8 sheets, clips, solids	170.00-175.00
18-8 borings, turnings	70.00-75.00
430 sheets, clips, solids	40.00
410 sheets, clips, solids	30.00

*Nominal.

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*18.50-19.00*
No. 2 heavy melting	*16.00*
No. 1 bundles	*18.00-19.00*
No. 2 bundles	*11.00*
Mixed borings, turnings	*7.00-8.00*
Machine shop turnings	*4.00-5.00*
Short shovel turnings	*10.00-10.50*
No. 1 cast	29.00-30.00
Mixed cupola cast	27.00-28.00
No. 1 machinery cast	32.00-33.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*25.50-26.50*
No. 2 heavy melting	*22.50-23.50*
No. 1 bundles	*25.50-26.50*
No. 2 bundles	19.00-20.00
No. 1 busheling	*25.50-26.50*
Machine shop turnings	11.00-12.00
Mixed borings, turnings	14.00-15.00
Short shovel turnings	14.00-15.00
Cast iron borings	14.00-15.00
Low phos. 18-in.	32.00-33.00

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	35.00
Charging box cast	36.00
Drop broken machinery	44.00

Railroad Scrap

No. 1 R.R. heavy melt.	*30.00-31.00*
Rails, 18-in. and under	43.00-44.00
Rails, random lengths	35.00-36.00

CHICAGO

No. 1 heavy melting	*29.00-31.00*
No. 2 heavy melting	*27.00-28.00*
No. 1 factory bundles	*30.00-32.00*
No. 1 dealer bundles	28.00-29.00
No. 2 bundles	22.00-23.00
No. 1 busheling	*29.00-31.00*
Machine shop turnings	*13.00-14.00*
Mixed borings, turnings	*15.00-16.00*
Short shovel turnings	*15.00-16.00*
Cast iron borings	*15.00-16.00*
Cut structurals, 3-ft	32.00-33.00
Punchings & plate scrap	32.00-33.00
Electric furnace bundles	31.00-32.00

Cast Iron Grades

No. 1 cupola	35.00-36.00
Stove plate	28.00-29.00
Unstripped motor blocks	24.00-25.00
Clean auto cast	37.00-38.00
Drop broken machinery	37.00-38.00

Railroad Scrap

No. 1 R.R. heavy melt.	*32.00-33.00*
R.R. malleable	40.00-42.00
Rails, 2-ft. and under	43.00-44.00
Rails, 18-in. and under	44.00-45.00
Angles, splice bars	37.00-38.00
Rails, rerolling	*44.00-45.00*

Stainless Steel Scrap

18-8 clips & solids	130.00-140.00
18-8 turnings	60.00
430 clips & solids	40.00
430 turnings	20.00-25.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*20.50*
No. 2 heavy melting	*17.50*
No. 1 bundles	*22.00*
No. 2 bundles	*16.50*
No. 1 busheling	*20.50*
Machine shop turnings	8.00
Mixed borings, turnings	8.00
Short shovel turnings	9.00
Punchings & plate scrap	*24.00*

Cast Iron Grades

No. 1 cupola	33.00
Charging box cast	27.00
Stove plate	29.00
Heavy breakable	24.00
Unstripped motor blocks	18.00
Clean auto cast	37.00
Malleable	28.00

BUFFALO

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	26.00-27.00
No. 2 bundles	20.00-21.00
No. 1 busheling	26.00-27.00
Machine shop turnings	13.00-14.00
Mixed borings, turnings	16.50-17.00
Short shovel turnings	17.50-18.00
Cast iron borings	16.50-17.00
Low phos.	28.00-28.50

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	37.00-38.00
No. 1 machinery	41.00-42.00

Railroad Scrap

Rails, random lengths	33.00-34.00
Rails, 3-ft and under	40.00-41.00
Railroad specialties	34.50-35.50

BIRMINGHAM

No. 1 heavy melting	23.50-24.50
No. 2 heavy melting	22.00-23.00
No. 1 bundles	18.00-19.00
No. 2 bundles	16.00-17.00
Cast iron borings	13.00-14.00
Short shovel turnings	16.00-17.00
Machine shop turnings	15.00-16.00
Electric furnace bundles	26.00-27.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	43.50-44.50
Stove plate	40.50-41.50
Bar crops and plate	29.00-30.00
Structural plate 2 ft	29.00-30.00
Unstripped motor blocks	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	26.00-27.00
Rails, 18-in. and under	40.00-41.00
Rails, rerolling	39.00-40.00
Angles, splice bars	36.00-37.00
Stand. steel axles	35.00-36.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	25.50
No. 2 heavy melting	23.50
No. 1 bundles	25.50
No. 2 bundles	19.25
Machine shop turnings	11.00
Short shovel turnings	12.00

Cast Iron Grades

No. 1 cupola	37.00
Charging box cast	29.00
Heavy breakable cast	29.00
Unstripped motor blocks	29.00
Brake shoes	30.00
Clean auto cast	39.00
Stove plate	31.00

Railroad Scrap

No. 1 R.R. heavy melt.	29.50
Rails, 18-in. and under	40.00
Rails, random lengths	37.00
Rails, rerolling	43.00
Uncut tires	32.50
Angles, splice bars	32.00

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	25.00
No. 2 heavy melting	21.00
No. 1 bundles	21.00
No. 2 bundles	16.00
No. 3 bundles	13.00
Machine shop turnings	11.50
Mixed borings, turnings	11.50
Short shovel turnings	11.50
Electric furnace, No. 1	32.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	30.00-35.00
Heavy breakable cast	25.00
Unstripped motor blocks	23.00
No. 1 wheels	21.00
Stove plate (f.o.b. plant)	28.00
Brake shoes	28.00

Railroad Scrap
(Delivered consumer plant)

Rails, random lengths	30.00-34.00

LOS ANGELES

No. 1 heavy melting	20.00
No. 2 heavy melting	16.00
No. 1 bundles	20.00
No. 2 bundles	16.00
Machine shop turnings	5.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	38.00-42.00

SAN FRANCISCO

No. 1 heavy melting	20.00
No. 2 heavy melting	16.00
No. 1 bundles	19.00
No. 2 bundles	16.00
No. 1 busheling	20.00
Machine shop turnings	5.00
Mixed borings, turnings	5.00
Short shovel turnings	9.00
Cast iron borings	9.00
Cut structurals	25.00
Heavy turnings	9.00
Punchings & plate scrap	25.00
Electric furnace bundles	19.00

Cast Iron Grades

No. 1 cupola	43.00-46.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	30.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	43.00

HAMILTON, ONT.

(Delivered prices)

No. 1 heavy melting	$22.00
No. 2 heavy melting	19.00
No. 1 bundles	22.00
No. 2 bundles	17.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Rails, remelting	32.00
Busheling, new factory: Prepared	20.00
Unprepared	16.00
Short steel turnings	12.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.

This announcement is neither an offer to sell nor a solicitation of an offer to buy any of these Debentures. The offer is made only by the Prospectus.

$300,000,000

(of which $75,000,000 are not publicly offered)

United States Steel Corporation

SERIAL DEBENTURES

Dated August 1, 1954 — *Due $30,000,000 on each August 1, 1955 to 1964, inclusive*

Interest payable February 1 and August 1 in New York City

Maturities	Interest Rates	Maturities	Interest Rates
1955	1.30%	1960	2.50%
1956	1.80	1961	2.55
1957	2.05	1962	2.60
1958	2.25	1963	2.65
1959	2.40	1964	2.65

Price for all Maturities 100%
and Accrued Interest

Copies of the Prospectus may be obtained from only such of the undersigned as may legally offer these Debentures in compliance with the securities laws of the respective States.

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GLORE, FORGAN & CO. — GOLDMAN, SACHS & CO. — HARRIMAN RIPLEY & CO. Incorporated

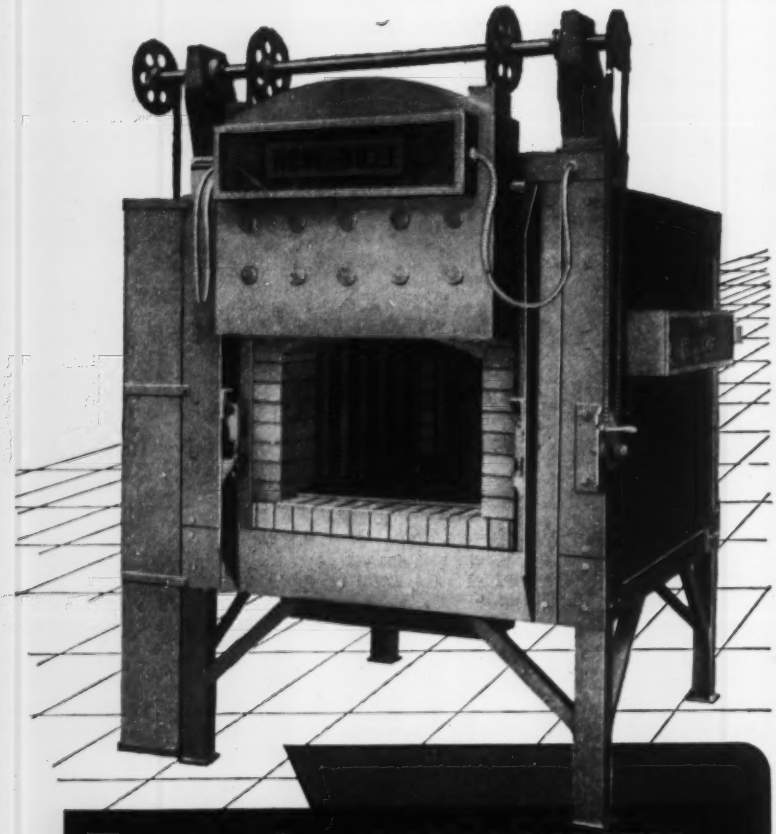
KIDDER, PEABODY & CO. — LAZARD FRERES & CO. — LEHMAN BROTHERS

MERRILL LYNCH, PIERCE, FENNER & BEANE — SALOMON BROS. & HUTZLER

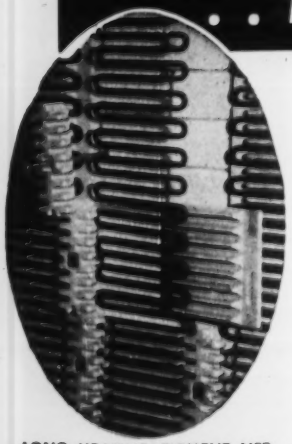
SMITH, BARNEY & CO. — STONE & WEBSTER SECURITIES CORPORATION

UNION SECURITIES CORPORATION — WHITE, WELD & CO.

July 29, 1954.



It's the RELIABILITY of HEVI DUTY Furnaces . . . that COUNTS



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Round rod return bend heating elements are adequately supported by radiant plates of high grade refractory material.

ADVANCED design, rugged construction and high quality materials are combined with years of furnace building experience to produce Hevi Duty box furnaces. Round rod heating elements and sturdy radiant plate element supports assure continuous performance under severe operating conditions. Users report that reliability and trouble free service are outstanding advantages of Hevi Duty furnaces.

Write for Hevi Duty Bulletin No. HD441

HEVI DUTY ELECTRIC COMPANY
HEAT TREATING FURNACES HEVI-DUTY ELECTRIC EXCLUSIVELY
DRY TYPE TRANSFORMERS — CONSTANT CURRENT REGULATORS
MILWAUKEE 1, WISCONSIN

(Concluded from page 155)

dealer has the largest over-supply he must get rid of to free working capital. There is little optimism for an August pickup. Rerolling rails continue the one grade in strong demand.

Washington — Requests that the government stockpile iron and steel scrap as a strategic and critical material, have been turned down.

Arthur S. Flemming, director, Office of Defense Mobilization, in a letter to Harry Wische, president, National Federation of Independent Scrap Yard Dealers, said it was the unanimous conclusion of a committee, composed of representatives of the various government departments and agencies to consider the proposal, that no adequate basis was presented for government stockpiling of scrap.

Cleveland—Scrap trading is slow in this area. The mills are showing little interest and, while some pickup in demand from the foundries is noted, many shops having resumed operations following vacation suspensions, tonnage movement is not imposing. At the same time, while demand is slack, curtailed manufacturing operations are resulting in noticeably smaller receipts of industrial material. As a general thing, traders do not anticipate much change in market conditions before next month.

Birmingham—The district's scrap market is inactive with little tonnage moving either for local or outside consumption. Hot weather has slowed the flow of material and prices are not attractive. Moderate tonnage of cast grades is moving.

Los Angeles—Dealers are hoping scrap sales will increase soon. Despite rumors of increased availability of offshore material, dealers in this area are not worried.

San Francisco—One of the area's independent steel producers is facing a strike threat. While the mill is small, it is an important consumer of scrap. This has further restricted the movement of scrap into consumers' hands and the glut continues. Despite that, nobody is looking for a price decline at least through September.

Seattle—Purchases of scrap by a Portland, Oreg., interest in Seattle territory is helping sustain local prices on a firm basis of $25 and $21 for No. 1 and No. 2 heavy melting steel, respectively. No. 1 cupola cast is nominally quoted at $35.

Supplies of steel and cast scrap are sufficient for current demands.

Stainless Steel . . .

Stainless Steel Prices, Page 140

Middletown, O.—Armco Steel Corp. plans construction of new rolling facilities at its Baltimore works to cost $5½ million. The project will consist of a bar mill especially designed to roll stainless steel in a wide variety of sizes and grades.

Pig Iron . . .

Pig Iron Prices, Page 140

Cleveland—Although many district foundries have resumed production following summer vacation suspensions, demand for merchant iron has not appreciably improved. Tonnage is moving on contracts but consumers are doing relatively little stockpiling.

Reflecting both slow steelmaking and foundry demand, pig iron production in this immediate district is off sharply. Only 5 out of 10 local blast furnaces are currently operating. One stack was taken out of production July 31 for an indefinite period. It had been on basic iron.

New York—Pig iron movement, which reached a low ebb in July, is expected to show little gain this month. Trade is more optimistic as to prospects for September as vacations and hot weather should be virtually over.

Buffalo—Merchant pig iron demand continues slow. Automotive and building needs for castings show further decline. Government work also is light.

Philadelphia—Pig iron demand is scarcely holding its own, with hot weather actually causing some order cancellations.

The Chester, Pa. blast furnace is quoting $48.50, furnace, for No. 2 foundry iron and $49 for malleable. This is $10 per ton under prices quoted by other district sellers. The price on basic iron, it is understood, will be set later.

As noted in these columns a week ago, the Chester furnace recently resumed operation after a suspension of many months. Carson, Marshall & Co., Lincoln-Liberty Bldg., Philadelphia, have been appointed exclusive sales agents.

Youngstown—Sharon Steel Corp. last week blew in a blast furnace at its Lowellville Works that had been idle for the past seven months. Also, Shenango Furnace Co. activated one of its two idle stacks.

Chicago—Shipments of pig iron in August still hold the prospect of bet-

RELAY RAILS
AND ACCESSORIES
Largest Inventory on Pacific Coast
DULIEN STEEL PRODUCTS, INC.
OF WASHINGTON
P. O. Box 3386 Seattle 14, Wash.

CLASSIFIED

Help Wanted

QUALIFIED BLAST FURNACE SUPERINTENDENT or Assistant on single stack plant. Give experience, education and salary expected. Write in detail. Reply Box 978, STEEL, Penton Building, Cleveland 13, Ohio.

GENERAL SUPERINTENDENT

Small, financially strong, Ohio steel plate and alloy fabricating plant with long record of profitable operation has opening for man of highest type. Permanent position with unlimited opportunity for growth. Must be thoroughly experienced in code welding practice, maintenance, costs and able to organize production and get results. Enclose photograph and give full experience with references and salary bracket expected. Only fully qualified need apply. Reply Box 997, STEEL, Penton Building, Cleveland 13, Ohio.

Accounts Wanted

NEW LINE WANTED

MANUFACTURER'S REPRESENTATIVE 15 YEARS COVERING DETROIT, TOLEDO AND LANSING AREAS, WOULD LIKE ADDITIONAL LINE. PREFER STEEL ACCOUNT OR PRODUCT USED BY THE INDUSTRIAL AUTOMOTIVE TRADE. REPLY BOX 101, STEEL, PENTON BUILDING, CLEVELAND 13, OHIO.

Positions Wanted

PLANT MANAGER

M.I.T. Engineering Graduate with Proven Record in Plant Supervision and Control of Related Functions Dealing with Production Planning, Tooling, Quality, Maintenance, and Industrial Engineering. Reply Box 100, STEEL, Penton Building, Cleveland 13, Ohio.

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Each additional word	.30	.38	.47

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STEEL *The Weekly Magazine of Metalworking*

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FOR SALE
Used — As Is — Reconditioned
RAILWAY CARS—
ALL TYPES
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STORAGE TANKS
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Blocks—Plates—Rounds
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of all types. Original equipment and replacement. Quick delivery from stock. Substantial Savings.
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Basic Manufacturers Since 1890.
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FOR SALE
1 Steel Stiff Leg Derrick 110' Boom —Complete with blocks.
1 American 3 Drum Hoist powered with 60 H.P., 440-220 volt motor.
1 Thomas 2 Drum Hoist powered with 100 H.P., 440-220 volt motor.
1 1¼ Cubic Yd. "Blaw Knox" Clam Shell Bucket.
Good Condition
Reasonably Priced
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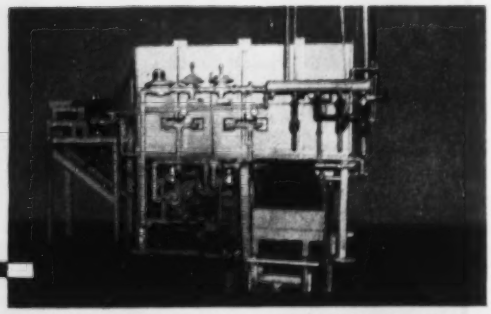
Phone WAlnut 7796

WANTED
LATE MODEL HYDRAULIC UNIVERSAL TESTING MACHINE. APPROX. 30,000 LB. CAPACITY.
THE LOCOMOTIVE FINISHED MATERIAL CO.
Drawer 480
ATCHISON, KANSAS

WANTED
METALLURGICAL LABORATORY EQUIPMENT
Dial indicating, tensile testing machine, of 120,000 pounds minimum capacity; Brinell, and Rockwell hardness testers, and miscellaneous laboratory equipment.
PHOENIX MANUFACTURING COMPANY
P. O. Drawer 1207
Joliet, Illinois

Clean harden even *smallest* parts



S&W SHAKER HEARTH with AUTOMATIC QUENCH

Have Samples Processed Free

Demonstration is more convincing than description! We'll show you how well the S & W Shaker Hearth can do your work — hardening, nitriding, carburizing, carbonitriding. Just send us small part samples and specifications. Without obligation, you judge the results.

You can clean harden a wide range of small parts economically — even the *smallest*, because muffle surface is smooth instead of grilled. There are no openings for small parts to clog or drop thru. Heat and atmosphere are conserved because muffle which carries work never leaves the furnace. Discharge is direct to automatic quench. Since no pit is needed for the quench, it may be used on floor level where convenient. Air operated, with high degree of variable feed from slow to fast. Accurate control settings do not vary, are easily reproduced. Option of oil, water quench, or heated salt for martempering and interrupted quench. Electrical or gas heated. Coolers, filters, pumps as required. Plan on high production at low cost.

S&W **SARGEANT & WILBUR, INC.**
182 Weeden Street, Pawtucket, R. I.

Complete Line of Electric and Fuel-Fired Furnaces To Meet Every Industrial Need
Atmosphere Generators • Ammonia Dissociators • Gas Conditioning Equipment

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DIES · RIVET SETS
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RIVETER DIES

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Since 1903

Large inventory of stock sizes of round punches and dies also rivet sets available for immediate shipment. Square, rectangular, oblong and elliptical shapes made to order.

Write Dept. A for New Catalog 54

GEO. P. MARCHANT COMPANY
1420-34 S. ROCKWELL STREET · CHICAGO 8, ILLINOIS

tering the July movement, but it is likely to be nip and tuck. With jobbing foundries reopening after vacation suspensions there has been no rush of orders.

St. Louis—Low demand for pig iron in this district is reflected in Granite City Steel's decision not to light one of its two blast furnaces which has been down nearly four months for relining. Ground stocks of iron are ample for the current slack demand.

Structural Shapes . . .

Structural Shape Prices, Page 136

Boston — Prices for fabricated structural steel in place are not reflecting fully the $3 advance in plain material and the increase in labor costs. Contractors shop for lowest estimates with competition for tonnage prevalent. Shop backlogs, however, are holding up. Three to four months with district units. Deals are frequently closed with erection the decisive factor, notably bridges, 300 to 500 tons. More tonnage is on estimating boards. Bolts, instead of rivets, are being utilized as fasteners for 87 bridges, approximately 17,000 tons for Maine turnpike extension.

New York—Featuring structural demand are awards of 14,800 tons of bridge work across the Hudson river, between Kingston and Rhinecliff, for the New York State Bridge Authority, and 5300 tons for the Supreme Court building in Brooklyn.

Philadelph'a—Phoenix Iron & Steel Co., Phoenixville, Pa., has advanced prices on standard and wide flange structurals $3 per ton to $3.95 f.o.b. mill, effective Aug. 2. This increase is in line with advances made by other producers earlier in the summer, but leaves the quotation of this mill still well under the general market and $7 a ton under its nearest eastern competitor.

Pittsburgh—Warehouses and mills report wide flange beams selling rapidly. Industrial construction slowed last month and in early August due to a number of plant vacations, but other building activities continue brisk. Production of wide flange beams is near capacity.

Los Angeles—Steel producers expect an upturn in demand this quarter. Large construction jobs for September are expected to boost sagging morale of the fabricators.

Seattle—Fabricators in this area report they are holding comfortable order backlogs, and the outlook for the coming quarter is seen as encouraging.

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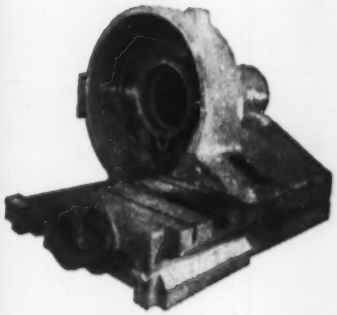
Hyde Park

RED CIRCLE Rolls ALLOY-CHILLED

Gray Iron Castings

Castings of any size up to 80,000 pounds. Hyde Park facilities are equal to your every requirement



Machine Castings
Lathe Beds
Housings
Pinion Housings
Mill Housings
Shoe Plates
Layout Plates
Surface Plates

Hyde Park

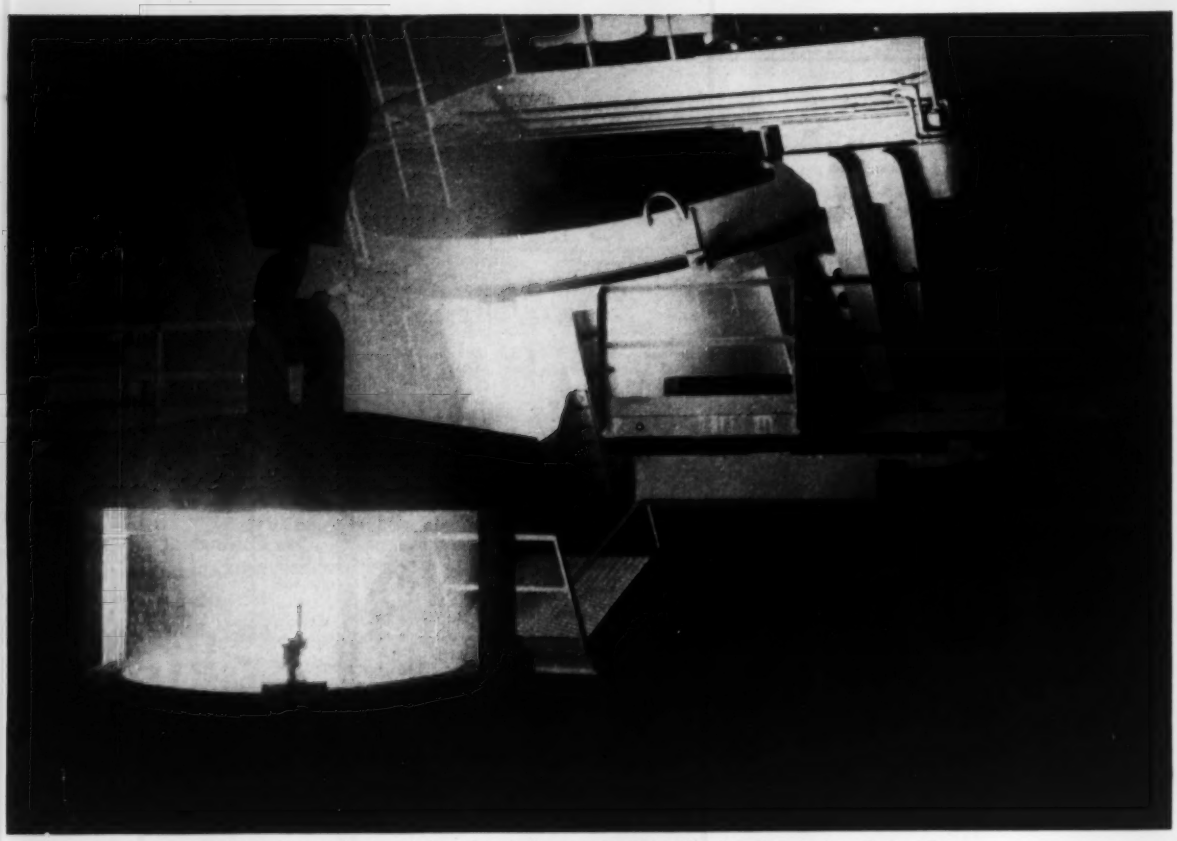
FOUNDRY & MACHINE CO.

Hyde Park, Westmoreland County, Pa.

ROLLS

ROLLING MILL MACHINERY

GREY IRON CASTINGS



Situated on a 65-acre, L-shaped tract, the modernized Los Angeles plant produces bars, rods, wire, bolts and nuts, light structural shapes. All steel is made in the plant's three electric furnaces.

OLD-TIMERS WOULDN'T KNOW THE PLACE

It's virtually a new steel plant that Bethlehem Pacific operates today in Los Angeles. It has been so expanded and modernized in the past eight years that it bears little resemblance to the plant which operated at an annual capacity of 117,000 tons at the close of World War II. Largest and most modern of Bethlehem Pacific's three plants on the West Coast, its annual ingot capacity has been boosted to 402,000 tons—nearly four times its potential in 1946.

This program has not been one of expansion alone. Modernization of all phases of steel production has been carried on steadily. Production equipment has been either replaced or rebuilt to such an extent that old-timers just wouldn't recognize it today.

Three new electric furnaces have replaced the veteran open-hearth furnaces. Two new rolling mills were installed; a third has been completely rebuilt. A new wire mill, the first to serve the Southwest, has been producing wire since 1948. The larger bolt and nut plant has been streamlined to produce a greater variety of fasteners and steel specialties. Laboratories, scrap handling, reinforcing bar fabricating shops and other facilities have been improved and enlarged.

With other steelmaking plants at South San Francisco and Seattle, together with steel fabricating works and other facilities on the West Coast, Bethlehem Pacific is continuing its program of modernization. Producing many forms of high-quality steel is our part in the growth and progress of the West.

BETHLEHEM PACIFIC COAST STEEL CORPORATION

Sales Offices: Los Angeles, San Francisco, Portland, Seattle, Spokane

Steel rods are rolled on the 10-inch, two-stand continuous mill at speeds up to 42 miles per hour, and bars at half that speed.

BETHLEHEM PACIFIC

BETHLEHEM STEEL

Cutaway shows compact interior design and construction of a typical Cleveland worm gear speed reducer, used in thousands of plants. Clevelands save floor space—are simple to install and maintain. A minimum number of moving parts practically eliminates trouble.

Why WORM gear? Why CLEVELAND?

HERE are some of the inside reasons why Cleveland worm gear speed reducers are specified by many of the leading builders and users of industrial machinery.

• **SAFE, SPACE-SAVING, RIGHT-ANGLE DRIVE**—Clevelands are compact, provide a wide range of reduction speeds. Worm and gear enclosed in sealed housing replace dangerous open gearing, belts and pulleys. Safety always for machine operators and lube men! Gearing runs in oil bath, insures positive lubrication, eliminates oil cans and grease paddles.

• **SMOOTH TORQUE FLOW**—By virtue of the sliding action of worm on gear, a Cleveland transmits power uniformly and smoothly. Constant angular velocity assures positive control of work on driven machine.

• **LONG-LIFE EFFICIENCY**—Experience demonstrates that Cleveland case-hardened worms and nickel-bronze gears actually improve with use. Even operating under continued, severe overloads, danger of sudden failure is remote. Thousands of Clevelands operate for the life of driven machines.

Get the complete Cleveland story by writing for new Catalog 400 today. The Cleveland Worm & Gear Company, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

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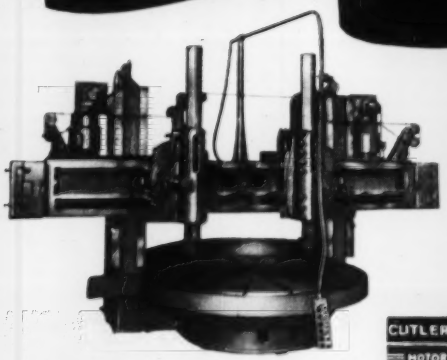
MOTOR CONTROL
C-H

CHOICE OF THE LEADERS — THE MARK OF BETTER MACHINES



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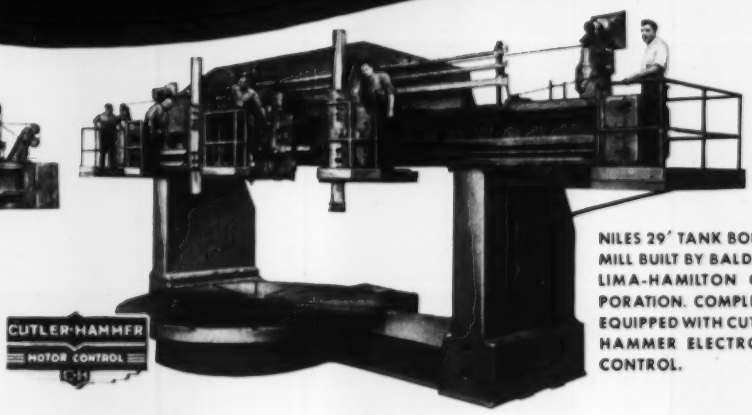

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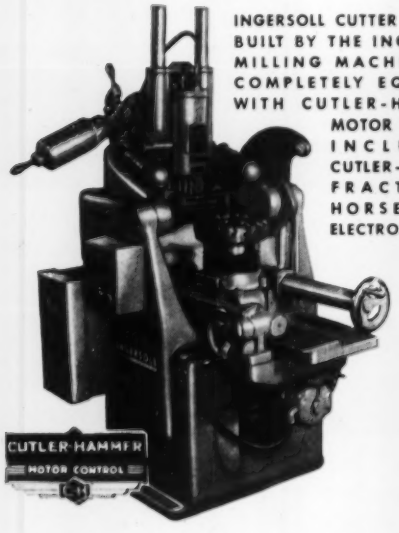
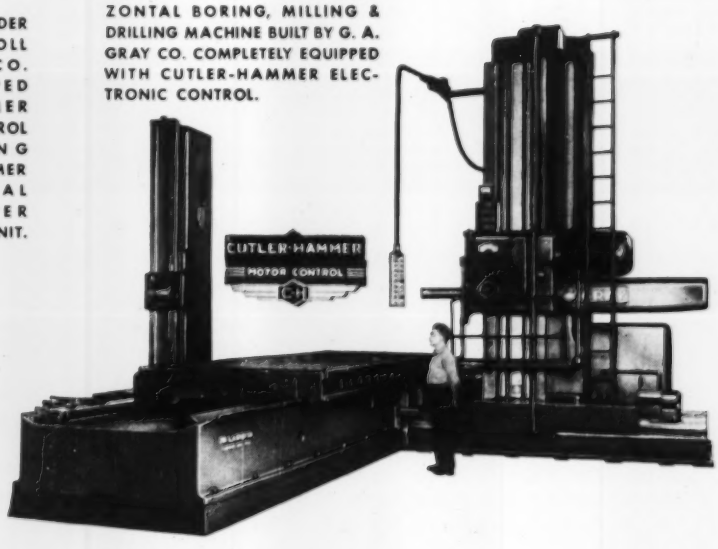


INGERSOLL CUTTER GRINDER BUILT BY THE INGERSOLL MILLING MACHINE CO. COMPLETELY EQUIPPED WITH CUTLER-HAMMER MOTOR CONTROL INCLUDING CUTLER-HAMMER FRACTIONAL HORSEPOWER ELECTRONIC UNIT.

GRAY 6" PLANER TYPE HORIZONTAL BORING, MILLING & DRILLING MACHINE BUILT BY G. A. GRAY CO. COMPLETELY EQUIPPED WITH CUTLER-HAMMER ELECTRONIC CONTROL.



Better all the way

In every field of manufacture there are a few companies consistently able to better fit their products to the needs of the user. These companies just as consistently win and hold preferred position in their markets. But *better* product means better all the way through, better in the part the company *builds*, better in the components the company *buys* to complete its product. And leading machinery manufacturers that build spectacular new but dependable machines capitalizing on advances in electronic control engineering refuse to compromise. They turn to electronic control by Cutler-Hammer, leader in motor control design for more than half a century, and now leader *as expected* in pioneering and developing electronic control. Cutler-Hammer is your safe choice for proved dependable and efficient electronic control. CUTLER-HAMMER, Inc., 1211 St. Paul Avenue, Milwaukee 1, Wisconsin. *Associate:* Canadian Cutler-Hammer, Ltd., Toronto, Ontario.